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ABSTRACT

This paper presents a discussion of the effect of the physical environment on children receiving day care services. Various dimensions of the physical environment which may affect the well-being of infants, preschool and school age children in group or family day care settings are examined. The focus is on the overall well-being and development of children rather than on questions of health and safety. Included in the review are current practices in designing and licensing day care settings, recommendations intended to improve the quality of the day care environment, and current research evidence which suggests ways in which the physical environment affects the behavior and development of children as well as the behavior of the adults involved in their care. Also included is a discussion of the usefulness of the Federal Interagency Day Care Requirements (FIDCR) as a means to control the quality of the physical environment in day care programs. These issues are examined under six major headings: indoor space, outdoor areas, play equipment, questions of organization and program, contextual constraints, and recommendations for changes in the FIDCR as they relate to the physical environment. (ED)

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CONCEPT PAPER ON

THE EFFECTS OF THE PHYSICAL ENVIRONMENT ON DAY CARE

by

Elizabeth Prescott

Thomas G. David

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I

INTRODUCTION

The purpose of this paper is to

- .describe dimensions of the physical environment which might affect the well-being of infants, preschool and school age children in group or family day care,
- .present current practices and recommendations,
- .examine evidence concerning possible effects of these practices, and
- .consider the usefulness of FIDCR regulations as a means to control the physical environment in child care.

It is important that the reader understand our particular interpretation of "well-being". We are not primarily interested in issues of health or safety. Although these are subjects of great importance, they will be dealt with at length in another position paper. Our primary concern is with "well-being" as it relates to opportunities for children to develop a sense of mastery, competence, increasing social and cognitive skills and positive self concept.

Therefore, technical aspects of fire safety, accident rates, health safety and questions such as what temperature water should be for wash basins will not be examined here. Our major focus is on the effect the physical environment has on the behavior of children and the adults who care for them. If we touch at times on issues of safety and health it is because regulations designed to prevent a specific

hazard sometimes have unanticipated consequences for other aspects of the program.

Since physical settings do not exist in a vacuum, we will look at circumstances which shape the environment. Some of these circumstances stem from assumptions the staff make concerning ways in which the program should be implemented. Other considerations are factors of neighborhood, climate, etc.

Our general format will be to present each topic accompanied by an examination of current licensing practices. Recommendations made by organizations concerned with setting professional standards (e.g., Child Welfare League, American Academy of Pediatrics, etc.) will also be examined as well as available research. Finally, we will turn our attention to the contributions of other viewpoints or clarify problem areas which need further study.

Throughout the paper we have included materials which we hope will demonstrate facets of the physical environment which are important to the "quality of life" for a young child. Much of what happens in day care appears to have little impact on the child one way or the other, and most experiences seem to be soon forgotten. A few things may be recalled with negative affect, shutting off possibilities for further exploration. Other experiences open the world for a child and provide positive memories which remain throughout the life cycle. It is these we hope to maximize.

In our informal interviews with children who have been in day care, we find that they remember relatively little. Their memories are seldom of adults, but usually of places and related sensations - the

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agony of lying still at naptime, not ever being able to get a swing, having one's back rubbed at naptime, digging in the sand under the big tree, having lunch outdoors on the grass.

Regulations are often framed and enforced by administrators whose chief motivation is to prevent things from happening which might have undesirable consequences. However, to the extent that administrators are removed from daily life with children, they are also shut off from much information about things which offer many opportunities for growth and promote joy and delight, even though these things occasionally create problems which end up on an administrator's desk.

There is a certain difficulty in discussing day care issues, given the diversity of the audience and the variety of models of day care in operation nationwide. Our intent is to discuss the relationship of the physical environment to two factors: the age of the children (infant-toddler, preschool, school age) and the type of care (center or family day care). However, most topics do not lend themselves to an exhaustive discussion of physical implications for all possible combinations of age group and type of care. A complicating factor is that much more information is available on preschool center care than on other types. Inevitably, our discussion will not cover every aspect of every type of care, but given the limitations of the topic and available information, we hope to present general concepts which can be applied in a range of settings.

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II

BASIC DESIGN FEATURES - INDOOR SPACE

Variables which are important to consider in the design of the environment have been described by Child Welfare League (1973), Licensing Abstracts (1971), Sale (1970), Cohen (1974), Environmental Criteria (1971), Osmon (1971) and others.

In the sections which follow, we will be discussing the aspects of design and "places" which are (or should be) part of a day care environment. Design can be viewed as strictly functional, to be dictated by criteria of safety, health and efficienty. Alternately, as Mayer Spivack (1973) suggests, design should be guided by more general human principles.

Spivack proposes the concept of *archetypal places*, and he links the ultimate success of any setting or institution to the provision of those places necessary to fulfill basic needs at each level of human development. If an institution denies access to large numbers of these places for long periods of time, it induces *setting deprivation* and creates an overload of functions in a limited setting. This incongruence between behavior and place leads in turn to maladaption.

Spivack lists thirteen archetypal places, and their application to child care environments should be of particular relevance, considering the range of places normally available in the child's home which the center may or may not attempt to recreate.

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Archetypal Places (Spivack, 1973)

Place*	Relevance to Childrens' Needs
Shelter	Differentiate subsettings; retreat from overstimulation and threat; emotional recuperation
Sleep	Associate bed with fatigue; learn volitional control of sleep; illness and recuperation
Groom	Learn to bathe, dress oneself
Feed	Coordinate feeding tools; communication; differentiate food from symbiotic source in mother
Excrete	Autonomously control excretion
Store	Learn to prepare food
Territory	Establish play "turfs"; orient to neighborhood; play protect terriroty from lookout; plan and wait
Play	Role modeling; interact with peers; fantasy, exercise, exorcism, creation, discovery, dominance testing
Route	Enlarge route maps; differentiate settings, provide social encounters; learn safe wandering limits
Meet	Regular play/meeting rituals and places; elaborate functions; dominance testing
Compete	Games; fight; agonistic ritual; dominance testing
Work	Acquire intellectual/motor skills
*Mate	Omitted for children

Spivack acknowledges that archetypal places are at present a theoretical notion, not backed by systematic data. Yet, looking at the places he proposes, they provide a goal outline to consider in planning space for day care.

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Acoustics

A dimension of the environment closely linked to children's desires for "quiet" and "no one bothering me" is noise, yet noise level has seldom been cited in state licensing standards[1]. Cohen (1974) states:

> *A low level of background noise can be pleasant; a constant high level is distracting and fatiguing. Noise from outside the facility can be reduced with sound-absorbing material on ceilings, walls, and floors; carpeting and draperies, for example, absorb sound from both outside and inside. The distraction of indoor noise can be minimized by separating noisy activities from quiet areas and by using dividers.*

Child Welfare League (1973) recommends:

> *Materials that help to control sound should be used for playroom ceiling and walls.*
>
> *Sound-absorbing ceilings are beneficial to children and staff.*
>
> *Soundproofing material in the exterior walls is desirable, particularly if the center is located in a multipurpose structure or close to other buildings.*

One problem in setting acceptable levels of noise stems from individual differences in perception of desirable versus too much. In considering acoustics, Environmental Criteria (1971) states:

> *It is not easy to determine what constitutes a satisfactory acoustical environment. It differs for children and adults and is influenced by the mood and background of the listener. Noise which makes adults flinch, is often interesting and enjoyable to children, who are naturally curious about sounds. In bad acoustical conditions, the teacher if often more miserable that the children. However, under these conditions, while the children may be enjoying themselves, they are not concentrating on the learning materials as well as they could otherwise.*

1/ Noise level is closely related to questions of privacy. We consider privacy a key dimension in the provision of day care and will discuss it under the heading of program organization.

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. . .

There is limited ability to translate responses such as "annoying," "bothersome," stimulating," and "soothing" into a physical description of the sounds producing them and to generalize about the effects of sounds on different people.

With this in mind, the following generalizations on acoustical environment are presented:

- *the level at which a constant background noise is acceptable is usually defined as that level which is consistent with the ability to hear normal speech easily*
- *continuous, featureless noise seems to have very little effect on performance unless the noise level is high*
- *extreme quiet does not provide an appropriate environment for many learning activities*
- *intermittant or irregular sounds are more annoying and distracting than steady sounds which do not elicit numerous shifts of attention*
- *noise which is familiar or unavoidable is less annoying than strange or unnecessary sound*
- *high pitched noise is more fatiguing and irritating than low pitched noise*

p. 32

They further suggest that:

One basic design recommendation for the planning of a day care facility it that whenever possible a site be selected in an area which has a low noise level. If a noisy site is unavoidable, provision should be made for sound interception in exterior walls and for landscaping to provide sound barriers.

The characteristics of sounds are frequently more important in the solution of sonic problems than the actual decibel level. Equal decibel levels related to sound pressure are not equal levels when different pitches or frequencies are involved. Loudness is a function of both volume (decibel) and pitch. It is the way that sound is experienced and the use to which the space is put that should determine the definition and solution of acoustical problems.

The control of reverberation - that is, the persistence of sound in a room - is an important aspect of sound control.

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It is directly related to the ease with which speech can be understood in areas in which a variety of loud activities are being carried on at the same time - this situation being characteristic in day care centers. Reverberation is a function of the volume and emptiness of space.

p. 32

Although the effects of noise on task performance in laboratory settings have been mixed (Kryter, 1970), there is a growing concern that continued exposure to noise in settings outside the laboratory can have effects that exceed mere annoyance, especially for young children. Miller (1974) in a review of the effects of noise, expresses his concern that

Because noise can reduce the amount of speech used at home, in the yard, or on the playground - and because noise can make speech difficult to understand - it is possible, though unproven, that the language development of early childhood might be affected. From this, difficulty in learning language and learning to read may ensue. One can only guess at how severe the noise must be to produce such effects; nearly continuous A-weighted sound levels in excess of 70 dB (decibels) might be required. . .

One piece of evidence that supports Miller's suspicion of possible language learning impairment due to noise is a study by Cohen, Glass and Singer (1973) of the effects of noise in a housing project on the reading skills of children who lived there. They sampled the auditory discrimination ability and reading achievement of 54 second-fourth graders who lived on various floors of a group of apartment buildings built over a noisy expressway in New York. It was found that children who lived in the lower (noisier) apartments of the buildings (where sound readings measured 66 dB on the eighth floor) scored substantially lower on a test of auditory discrimination than

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students who lived on the top floors (average sound reading 55 dB).

Cohen et al. conclude that *Apartment noise level accounts for a substantial proportion of the variance in auditory discrimination, and the latter variable contributes significantly to variance in reading achievement.* Prolonged noise exposure is directly related to the inability to attend to acoustic cues. The longer the exposure to the noise, the more these deficits in discrimination should become evident (and this was true of students who had lived in the buildings the longest). High noise levels in the home have also been reported to have a negative effect on the learning of auditory discriminations by Deutsch, Katz and Templin (Fein and Clarke-Stewart,1973)and by Jensen (1966).

To put Cohen et al's decibel readings in perspective, Walsh (1975) in a study of noise levels in open plan schools notes that background noise levels of kindergarten and lower elementary classes are the highest found in schools and that they commonly exceed 70 dB To combat the annoyance and potential damage of noise, Walsh suggests that

> *. . . open plan class spaces should be provided with as many sound absorption materials as possible, particularly carpeted floors and highly absorptive ceiling materials. The ceiling surface should provide maximum sound absorption in the speech frequency region (approximately 250 Hz to 2000 Hz) and should have a Noise Reduction Coefficient (NRC) in the range of .90 to .95.*

Other suggestions that Walsh makes to decrease noise in open plan schools are to;

-carefully select and orient fluorescent light fixtures. Select fixtures smaller than 2 x 4 feet and place them in alternating patterns rather than in straight rows

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-cover large vertical wall and barrier surfaces with sound absorptive finish materials

-fully drape large areas of glass to cover the entire window area (with drapes of 150-200% fullness for best effect)

-increase the amount of floor space available per student from the standard 25-35 square feet per student to 50-60 square feet per student to achieve an average background noise level of 65 dBA.

Although Walsh's data refer to large open plan schools, the implications are clear for day care centers. Not only should noise be looked at inside the center (particularly in converted spaces that lack acoustical treatment) but also in the location of centers. Cohen, Glass and Singer's study of apartment noise could be compared to day care centers located in similar settings. We have seen outside areas which were unbearably noisy because of their location adjacent to an airport or alongside a major traffic artery where the constant flow of large trucks made conversation almost impossible.

In discussing interior acoustics in open plan schools, the EFL report Schools Without Walls (1965) states two do's and don't's:

> *(1) Of the two horizontal surfaces in the room, floor and ceiling, treat only one acoustically - the floor. Treatment of both may have a deadening effect on the space. An acoustically absorptive (i.e. carpet) floor stops unwanted sound where it starts; a hard ceiling reflects wanted sounds to where they are wanted.*
>
> *(2) Make the total dimensions of the room large enough so there can be adequate separation between work groups and make sure the population of the room does not exceed the number of noise makers it was planned for.*
>
> p. 31

Frank Brunetti (1975) notes two major findings from his studies of classroom noise. One was that a primary factor in dealing with noise was the density ratio, i.e., the number of students per square foot. Noise level rose with increased density. He also found that experienced distraction by noise varied with type of task and type of program.

Perceived noise distraction was higher when the task was paper and pencil and required concentration. There was more tolerance of noise when the task involved the use of a wider range of materials. In individualized programs where a considerable amount of movement was permitted, distraction from noise was less than in group structured programs. Brunetti also commented that students in open, carpeted space were less distracted by noise than those in conventional space.

When asked about recommendations for control of noise, he stated that good design using variations in ceiling height and newly developed materials makes a vast difference in acoustics. His most firm recommendation was that number of square feet per child should be controlled, a finding echoed by Walsh.

Brunetti's recommendation about the regulation of density also parallels our experience. Noise level becomes a problem indoors when there is not enough space per child. This problem is compounded by hard flooring. Carpeting greatly reduces noise level.

A somewhat different noise problem, although still attributable to density, arises when noisy and quiet areas have not been adequately

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separated. Sometimes this occurs as a result of poor planning where one group's story time has been located next to another group's boisterous block play.

A more difficult situation exists where children who are awake must share an area with children who are napping. For example, school age children may be housed in the same room with napping preschoolers. A similar difficulty can arise in infant-toddler programs where sleeping patterns are still highly individual.

Brunetti (1975) also found that noise bothers teachers more than children. This finding very much tallies with our experience. Given the long working day in day care as compared to nursery school, noise level perhaps needs to be given more attention than it has received. Preoccupation with children's noise by staff can have a significant effect on the total program, as Paul Gump (1975) has observed:

> *Although the effects of noise are often minimal, the prevention of noise can have persisting and important program effects. An interview study of 12 teachers in an open school showed that most were quite concerned that their groups not cause noise, and they took one or another of the following precautions: they admonished children not to express enthusiasm too vigorously; they avoided use of learning aides such as record players; they were "careful" about outside speakers; and they strictly limited vigorous physical and vocal activity to recess or to an assigned time and place.*
>
> (Gump and Iliff, 1971, in Gump, 1975)

Density

Although it is not uncommon in a traditional schoolroom to allow only 20-25 square feet of floor space per student for a sedentary curriculum, the space requirements of a day care program should be

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substantially different. Chapman and Lazar (1971) summarize the current minimum space figures required for licensing by state:

Space Regulations - Licensing Requirements of States

Indoor		Outdoor	
sq. ft. req.	no. states	sq. ft. req.	no. states
50	1	200	1
35	33	100	7
30	8	80	1
25	2	75	22
20	2	60	2
NA	5	40-50	4
		none	7
		NA	5

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Cohen (1974) has made the following recommendation for indoor play space:

> *Rooms need to be large enough for active play and a feeling of openness, but not so large that children feel lost or threatened. A playroom needs at least 35 square feet of usable space per child (not including storage areas). Fifty square feet per child is preferable. In larger programs, it is usually useful to have a room that is big enough for 15 to 20 children, but the size of the group should not be increased just because a big room is available. Smaller rooms are useful for specialized activities and when children require more quiet, individualized, or structured activities.*

The Child Welfare League has recommended the following standard for indoor and outdoor space:

> *Size of playrooms*
>
> *A ratio of 50 square feet of playroom floor space per child, exclusive of space occupied by sinks, lockers, and storage cabinets, is the optimum requirement for appropriate program activity and comfort.*
>
> *Each playroom for a group of 15 children should have 750 square feet of floor space, in addition to the area occupied by such fixed equipment as sinks or lockers.*

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The playroom should provide room enough for each child to move about freely during activities, and sufficient space for a variety of activities to take place simultaneously without the children crowding each other.

A minimum requirement for indoor space of 35 square foot per child may be adequate where climate permits an interrelated use of indoor and outdoor space for most of the year.

Size of outdoor play area

To permit active play, it is desirable to have 200 square feet per child of outdoor space, with a variety of equipment, both large and small, stationary and movable, for each group of children.

An area of 3000 square feet (or a lot equivalent to 50 by 60 feet) for a group of 15 children is optimum. In crowded urban environments, it may be necessary to use a smaller space, but it should not be less than 50 square feet per child.

It is preferable for each group of children to have a designated area solely for its own use, preferably adjoining the playroom.

If two or more groups use the same playground at the same time, it should be large enough for separating the groups so that each can have appropriate equipment and space.

p. 83

Along with the proliferation of recommended standards for density, there have been a number of experimental investigations of the effects of varying density on the behavior of young children with somewhat mixed findings. (See Table 1.)

McGrew (1970) distinguished between two types of density: social density (in which varying numbers of people occupy the same fixed space) and spatial density (the dimensions of the space are changed while the population remains fixed). In a study of varying social and spatial density with 3 and 4 year olds, she observed more proximity

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TABLE 1

DENSITY/CROWDING (cont. on opposite page)

Study	Subjects	Setting	Observed for
Hutt & Vaizey 1966 Social	15 children, 3-8 yrs, autistic brain-damaged, normal	Hospital playroom, free play time, three 15-min. observations.	Aggressive/destructive social interactions; boundary (3 ft or less from wall.
McGrew 1970 Social & spatial	20 children, 3-4 yrs; 11 girls, 4 boys; Scottish, M-C*	Nursery school playroom; free play time	Contact; close proximity (less than 3 ft.); intermediate proximity (in same 7 ft. square); solitary (only child in square)
Loo 1972 Spatial	60 children, 4-5 yrs; 30 boys, 30 girls; M-C; groups of 3 boys and 3 girls	Experimental room 2 free play sessions of 48 min.	10 behaviors: social interaction, aggression, dominance, interrupting, nurturant, resisting, submissive, solitary, onlooker, group involvement.
Preiser 1972 Spatial	15 children, 3-4 yrs; 6 boys, 8 girls; white, M-C	Nursery school room; ½ hour free play, 6 weeks	Locations, props used, posture, interactors
Rohe & Patterson 1974 Spatial & Resources	12 children, 2-5 yrs; 6 boys 6 girls; white, M-C	Day care center during 45 min. free play periods	Social interaction: 6 categories; Participation: relevant or irrelevant (to area); Constructiveness: constructive/destructive use of area
Shapiro 1975 Spatial	274 children, 4 yrs.	17 half-day preschool programs; free play	Deviant: disruptive, aggressive; Random: unfocused; Onlooking: watched others (indices of non-involvement)

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TABLE 1

DENSITY/CROWDING (cont. from opposite page)

Density Condition	Findings	Recommendations
3 group sizes: 6 or less; 7-11; more than 12. about 59 sq. ft to 20 sq. ft.	Aggression/destructive increased with density; social interaction decreased with density (for normal and brain-damaged children). Boundary increased with density (for autistic children).	
4 conditions of varying spatial & social density from: 89 sq. ft. to 39 sq. ft.	More proximity in low density condition; social factors predominate in density effects (distance maintained independent of amount of space); trend to less physical contact at high density.	
2 conditions: 44.2 sq. ft to 15 sq. ft.	Less aggression in high density; boys more aggressive than girls (low density); less interaction in high density (more solitary than group involvement)	
2 conditions: 35 sq. ft. to 20 sq. ft.	Solitary play decreased with density but drop in social contact with density; no increase in social contact; more standing; less sitting; use of areas changed.	More differentiation of space. Need at least 35 sq. ft.
4 conditions: resource/density 48 sq. ft. to 24 sq. ft.	As density increased, aggressive, destructive & unoccupied behavior increased (relevant participation and constructive decreased); As resources increased, cooperative, constructive & relevant participation increased (irrelevant decreased). Increase of interaction (negative) at high density/low resources; critical to interpretation of other studies where interaction decreased as density increased.	Low density/high resource condition highest:relevant participation and constructive; high on association and cooperation, too. If density unavoidable, increase resources.
Classified into 3 types: small, medium, large; 52 sq. ft. to 29 sq. ft.	Most crowded led to most non-involvement; most involvement in medium density; need organization boundaries between activity areas; more random behavior in large settings.	More than 30 sq. ft. and less than 50 sq. ft.; quality important too as well as quantity: organization.

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behaviors at low density and a trend to less physical contact at high density. McGrew contends that social factors predominate in density effects in that a subtle spacing mechanism keeps interpersonal distances relatively contant even with a switch to high density.

Hutt and Vaizey (1966) in a study of a small sample of normal, autistic and brain damaged children under conditions of varying social density in a hospital playroom, also noted a decrease in social interaction with increased density. But they also found that aggressive and destructive behavior increased with density for the normal and brain damaged children and that boundary behavior (within 3 feet of a wall) increased for the autistic children.

In a further study in a playroom that was irregular in shape and divided by partitions and benches, Hutt and Hutt (1970) found that increasing density brought on territorial behaviors that were absent in the open, rectangular playroom. This is a finding that has not been noted in other density studies, perhaps due to the similarity of their stimulus rooms to the rectangular hospital playroom.

Bates (1972) in a study similar to Hutt and Vaizey's also found an increase in aggression with density, but also found increased interaction. This was particularly true of the boys, who tended to congregate in larger groups as the density was increased while girls formed smaller groups or played alone.

A contradictory finding for aggression was obtained by Loo (1972) who observed less aggression with 4-5 year olds under high spatial density conditions in an experimental room. She also found less interaction in her high density condition (more solitary than group

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involvement), a hypothesized reaction to the threat of the high density condition.

A recent investigation by Rohe and Patterson (1974) varied both spatial density and the amount of material available in a day care center. As density increased, they observed an increase in aggressive, destructive and unoccupied behavior. As the amount of resources increased, cooperative, constructive and relevant participation increased (irrelevant participation decreased). The marked increase of negative interaction under the high density/low resources condition observed by Rohe and Patterson seems critical to the interpretation of the other density studies. Density is more than just the amount of available space; it is linked to the arrangement of that space and the types of resources available in that space as well. Rohe and Patterson cite the optimal day care environment as one of low density (at least 48 square feet per child) and high resources. Under this condition they found the highest percentage of relevant participation and constructive behavior. Associate and cooperative behaviors were reasonably high as well. If high density is unavoidable, they suggest increasing the amount and quality of resources to provide activity options.

Shapiro (1975) in a survey of 17 half-day preschool programs in New York supports Rohe and Patterson's finding that both spatial density and resources are important. She recommends a density between 30 and 50 square feet and notes the importance of the organization of space and clear boundaries between activity areas as a precursor to involvement behavior. Her main complaint against the lower density settings (52 square feet per child) was the lack of clear organization

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- a situation that could be remedied via rearrangement of existing space.

Climate Control

In establishing desired performance criteria for climate it is important to keep in mind that, as Environmental Criteria (1971) notes

> . . . *optimum thermal conditions vary according to the individual's age, sex, health, activity level, and other factors, and that no two researchers agree on exact combinations of radiant temperature, air temperature, relative humidity and air movement that constitutes the optimum.*
>
> p. 33

To that disclaimer we might add that regional differences in climatic conditions made any one standard difficult to define.

Current licensing standards usually specify adequate safety guidelines for heaters and other mechanical equipment, and some states, such as New Jersey, specify an optimum indoor temperature, e.g., *68-72° one to three feet from the floor*. Other regulations attempt to address circulation by specifying that a certain number of windows (e.g., 50%) must be openable, a standard that might be of questionable value depending on local climate. One gap in current guidelines is the specification of a maximum permissable temperature during summer weather - a seemingly important area not ordinarily addressed by state standards.

Here is a sampling of current recommendations for climatic control in day care facilities:

The Child Welfare League (1973) recommends:

> *A temperature of 68 to 72 degrees within two feet of the floor should be maintained for children's playrooms.*

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Each playroom should have a thermometer.

Air-conditioning is desirable in hot weather or in hot climates.

Portable heaters should not be used in a playroom. If an open fire is used, it should be securely screened. Stoves, if any, should be fastened permanently in the least used corner of the room and screened off so that children cannot touch them.

Radiators require protective covering.

Central heating, with recessed radiators, is desirable.

Cohen (1974) proposes:

Rooms used by children should have either windows that open to provide fresh air or adequate ventilating systems. Heating systems should be able to maintain room temperatures of 68° or 70° F at the level where children's activities take place - that is, at or just above floor level. No rooms occupied by children should be overheated, and all drafts should be eliminated. In hot climates, air conditioning is desirable.

The American Academy of Pediatrics (1971) recommends a similar standard:

Areas used by the children should be heated when the temperature falls below 68° F, so a temperature of 68 to 72° is maintained at the floor. An adequate and safe cooling facility should be provided when temperature and humidity levels become excessive for normal comfort.

All rooms should be adequately ventilated, without drafts, by means of windows which can be opened or by an air-conditioning or ventilating system. Safeguards to prevent children from falling from window openings must be provided. All windows, doors, and ventilators should remain closed unless protected against insects with securely fastened screening as the season requires. All outside windows and doors must be equipped with screens or guards which can be removed from the outside or broken into from the outside in case of fire or other disaster.

In a discussion of climate control, Environmental Criteria (1971) cite Waechter and Waechter's notion that preschools and day care facilities pose unique thermal problems:

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In a preschool, young children contribute radiant body heat, just as larger children do, but there is more space for each child and a greater variety in space distribution as compared with a typical classroom.

The problem of exposure to the radiant temperature which may occur near windows is less grave than in classrooms for older children because preschoolers constantly move around.

Very young children love to play on the floors, requiring warm floors and favoring radiant floor panel heating or carpeting[2]*.*

Preschools, particularly those with a half day program, have a relatively short heating period and the system used must be capable of quickly warming or cooling the building.

Since the children are so small physically, the thermostats in the classrooms should be placed no higher than their heads so that the system will be responsive to conditions at the child's level.

In day care centers serving infants, special consideration needs to be given to the thermal climate of the infant care area.

p. 33

They propose the following standards:

Radiant temperature - the average temperature of surrounding surfaces should be the same as air temperature; a floor temperature that is warm to the touch, 79° F optimum.

Air temperature - 65° F to 70° F is optimal for vigorous activities; 72° F to 75° F is optimal for sedentary activities.

Air movement - 20 to 40 lineal feet per minute measured at approximately 30 inches above floor level.

Relative humidity - 40% to 60%.

Outside air - 15 to 30 cubic feet per person; 0.3 to 0.8 cubic feet per minute per square foot.

2/ Osmon (1971) states that radiant floor heating may not be as satisfactory a solution as anticipated, that constant floor heat can be unpleasant.

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Heating is most easily and economically secured in buildings which have proper wall and roof insulation and solar radiation protection. This last point is very important where large areas of glass are used. The use of glass for natural lighting may conflict with effective thermal control. Heat loads produced by daylight and electric light systems represent a big design concern in large school buildings, but may not be of much concern in small day care centers.

The type of heating and ventilating which should be installed in preschool day care facilities depends upon many factors: original cost, operating cost, maintenance services available, the size of the facility, and state and local building standards.

Air conditioning has become practically mandatory in climates where cooling is of equal if not more importance than heating. Day care centers which are in operation throughout the year should consider the possibility of a dual heating and cooling system even in parts of the country where summer is of short duration.

There are other factors which influence comfort, but which are not directly concerned with the production or removal of heat. These include odors, dust, dirt and such atmospheric contaminants as smoke and exhaust fumes. They need to be eliminated to the greatest possible extent in the interests of health as well as of comfort.

p. 33

Although our experience with climate has been primarily in the Southwest and, therefore, limited, we have often encountered excess heat indoors, both winter and summer. In summer, both indoor and outdoor heat often was almost unbearable due to the fact that much day care is housed in buildings which do not have air conditioning. In addition, day care settings often lack the space, shade trees and available water play which make homes pleasant even in hot weather.

Mechanisms for climate control should be flexible and responsive to local needs. Their objective, simply stated, should be to promote the comfort of children and staff and permit full program operation in the fact of adverse external climatic conditions.

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Lighting

Licensing standards quite often mention lighting. Some samples of licensing standards are the following (from Abstracts of State Licensing Requirements, 1971):

> *Wisconsin: There shall be a minimum of 20 footcandles of illumination throughout every room used by children as measured by a light meter maintained on a horizontal plane 24" above the floor.*
>
> *California: Window space must be one-eighth of the floor area of the room and 50% of the required windows must be openable.*
>
> *Kansas:* In addition to 20 foot candles, requires; *Windows shall be located so as to permit the children to see outdoors; low windows which present a hazard to children shall be effectively screened or guarded.*
>
> *Oklahoma: The recommended lighting is 25-35 footcandle power.*
>
> *New Jersey: The rooms shall be . . ., sunny.*

Child Welfare League (1973) proposes the following standard:

> *Each playroom should have outside windows, the area of which is at least 10 percent of the floor area, and artificial lighting of at least 25-35 footcandle power.*
>
> > *Windows low enough for children to look out are a source of pleasure and learning. Higher windows can be equipped with platforms (with proper protection against falling) on which children can stand.*
> >
> > *Adjustable shades are needed in each room to give protection from glare and to produce an atmosphere conductive to relaxation at rest time.*

The discussion of the technical aspects of lighting are well presented in Environmental Criteria (1971). We present them in their entirety (pages 23-24).

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Light

It is difficult to overestimate the importance of good lighting. A publication by the National Council on Schoolhouse Construction states, "... research has produced irrefutable evidence that a properly designed luminous environment can help students and teachers and contributes to the conservation of energy for psysiological growth and developmental needs and the maintenance of a tension-reduced instructional climate." (117)

A good lighting environment encourages good housekeeping practices and orderliness and lessens discipline problems. It also helps create a positive and aesthetically pleasing surrounding for teaching-learning activities and certainly increases the safety factor of facilities by decreasing the chances for accidents.

"Perhaps one of the most overlooked advantages of a good visual environment is that it helps equalize education opportunity for those with substandard vision. This is true because a person with substandard vision benefits more than a person with a standard vision as the visual environment is improved. Since studies have shown that approximately twenty percent of pupils attending the elementary grades have substandard vision, the need for providing better than the minimum quality visual environment is apparent." (117:122)

Preschool facilities have some illumination requirements which differ from schools for older children. Older children sit in one place and work at a well established desk level. The activities of preschool children are more diversified. They take place in various subdivisions of the room and at floor, table and standing level.

Terminology

The difference between quality and quantity of light needs stressing. A sufficient quantity of light is important, but other factors such as glare, light distribution, and source brightness play an important role in good visual environment.

Although still a highly important factor, the foot candle (the measure of quantity of light) is no longer the recognized measure of lighting efficiency because foot candles alone do not determine how well one sees. The National Council of Schoolhouse Construction states that the concept of brightness-balance has been adopted as the informed approach to the design of an acceptable visual environment for schools. "The concept of brightness-balance stresses the correlation of values of brightness difference and brightness patterns with values of lighting levels and varying tasks." (117:121)

The brightness of a surface results from the light it reflects to the eye. Glare is excessively high brightness and is of two types, direct and reflected. Direct glare, resulting in distractions, discomfort or a reduction in visibility, is commonly caused by windows and lighting fixtures. It is light which the eye sees directly. Reflected glare is brightness which the eye sees reflected from a surface. Reflected glare is at a minimum when the area producing light is maximum or when the brightness difference between the ceiling and the luminaire is minimum.

The following chart presents the recommended levels of illumination for areas within the day care center.

"Most visual tasks are seen by reflected light; depending upon the character of the task, reflected glare may or may not be a problem." (117:128)

Since the eye adapts when it fixes on a task, any change in the brightness level requires a readaption of the eye. For this reason, the brightness relationships of the various surfaces in the entire visual field should be kept within recommended limits. It is usually desirable to limit the brightness of light sources exposed toward the work so that seeing is not hindered by reflection from the detail of the task, nor from the background. Recommendations concerning levels of illumination (quantity in terms of foot candles) must be related to the visual tasks to be performed and the design of the lighting system.

ROOM	FOOT-CANDLES	
	Detail	General
Classroom/Playroom	30	70
total group activity	30 50	
arts/crafts	50 70	
book center	50 70	
blocks center	30 50	
housekeeping/dramatic play	30 50	
nature study/science	50 70	
Tutoring/quiet	50	70
Infant Care	30	50
Observation	2	20
Music	30	50
Indoor Recreation	15	
Bathroom (Children)	30	
Multipurpose	30	50
Teachers Office	50	100
Material Preparation	50	100
Kitchen	50	70
Dining	15	30
Exec. Dir. Office	50	100
Educ. Dir. Office	50	100
Secretary/Clerical	100	150
Conference/Board	30	50
Staff Lounge	15	30
Medical/First Aid	50	100
Health Personnel	50	100
Parent/Community	30	50
Psychologist Office	50	100
Speech Therapist Office	50	100
Social Worker Office	50	100
Lobby/Reception	15	30
Student Work Room/Univ. Affiliated	50	100
Volunteer Auxiliary	30	50
Mechanical	10	
Janitorial	20	
Corridor	10	
Bathroom (general)	20	
Storage (classroom)	20	
Storage (general)	10	

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As mentioned previously, foot candle recommendations cannot be divorced from the type and layout of the related lighting system. Under optimum conditions for visual comfort and efficiency, the brightness of the surroundings should be uniform and slightly lower than the brightness of the task, but this is often difficult to achieve.

Some of the accepted methods of achieving brightness balance are:

- Ceilings, walls, woodwork, etc., painted for high light reflection
- Paint finishes matte rather than glossy
- Light colored furniture and equipment
- Light colored tack and chalk boards
- Light colored floors
- Multi-source daylight
- Continuous windows
- Window heads flush with ceiling
- Minimum width window mullions

Design Considerations

Daylighting

The same criteria for good lighting should be applied to daylighting as to artificial illumination. Actually, a greater variety of conditions prevail in daylighting than in artificial lighting because of the wide variety of fenestration material and the many ways in which the materials are used.

Glazed areas are provided in classrooms and playrooms for two purposes: to admit daylight into the room and to permit occupants to see out. In considering the latter purpose, EFL reports, "In planning the number and placement of windows, consideration ought to be given to the view outside the window. Where the school setting affords a pleasant, changing view, windows might be included as integral parts of the classroom. Windows should be low enough for the children to see through. When windows would expose the monotony of a brick wall, the space traditionally given them might be better used as space for classroom display." (115:7)

Glazed areas designed to admit daylight must exclude direct viewing of the sky and maintain a favorable brightness-balance in the room. Daylight can be provided through the use of windows, the glazing of inner walls toward corridor, clerestory windows, and skylights.

A new unit of measurement of light is currently being developed which takes into account all the factors for proper illumination that have previously been discussed. It is called "visual performance index" (VPI) and will replace the typical foot-candle charts in the near future. It is recommended that VPI figures be adopted as soon as they are available.

Regulation of the presentation of light and heat can be achieved through a variety of methods, the most satisfactory probably being the orientation of the building. Classrooms facing north provide the most even distribution of light. However, experiences have shown that in temperate zones, school room wings should face southeast to receive early morning sunlight. (120:58)

Daylight can also be controlled by the use of roof overhangs or canopies above the windows. How far they should project and the extent of their perforation needs to be determined carefully. The use of louvers inside the room, including the relatively inexpensive venetian blind, offers effective light control when properly operated. Tinted glass and the humble window shade are also means of light control. When the exclusion of most of the light is desired for the use of visual aid equipment, black shades may be advisable.

Artificial Lighting

To attain a balanced visual system concerned with comfort and efficiency, it is necessary to design both the electric lighting and the day lighting against the same criteria. The goal in both cases is the production of a glare free visual environment where the brightness-balance is appropriate to the activity performed.

A good rule-of-thumb to follow concerning illumination for a preschool facility is to provide a proper artificial lighting system as if no other lighting source was available.

A glare-free system of illumination is one which distributes the light to the task from all angles and in equal amounts. In the use of artificial lighting system, this means:

- a luminous ceiling or wall designed semi-indirect system that produces uniform ceiling and side wall brightness is optimum.
- the least desirable systems are those in which the source of light is of small physical dimensions and is coupled with dark ceiling areas between light sources
- systems of large surface area, low-brightness luminaires with wide lighting distribution characteristics and minimum brightness at angles which produce reflected glare, will produce the highest contrasts in the table
- direct lighting systems are improved with the use of a good polarizing panel instead of lenses or simple diffusers
- in small rooms, conventional ceiling light sources are generally satisfactory for providing adequate lighting levels
- fluorescent lighting is preferred to incadescent when the lamp is exposed to the task as in louvered-bottom direct lighting systems.
- lighting systems which have diffusing or refracting material below the lamps, such as semi-direct fixtures or luminous ceilings, are best fluorescent lighting systems are the most practical way to provide recommended lighting levels for classroom.
- if incandescent lamps are used for general lighting, indirect luminaires provide the most suitable quality.
- illumination levels for incandescent lighting systems are usually limited to about 30 foot candles due to the heat produced.

Conclusions

There is not one definite or optimal way to design a proper visual environment for the preschool child. The design principles established for the visual environment, however, should not and need not be compromised in favor of other considerations. Within the design limits, there is flexibility for creating a great many reasonable, practical and attractive solutions.

Frank Brunetti (1975) says that he sees two problems with lighting in school settings. One is the tendency to light everything at high intensity, and he comments that every square inch of the environment does not require 100 footcandles. The second is the tendency to let lighting dictate where the children will be placed (if lighting does vary). He states that either of these options make for a poor visual situation.

We cannot recall seeing a center which did not have enough light; however, our experience may reflect conditions in the Southwest. On the contrary, we have on occasion encountered centers which were lit like a factory assembly area. Such problems occur mainly when natural lighting is at a minimum. Cohen (1974) proposes:

> *Each room needs adequate glare-free lighting. While daylight should be used as much as possible, artificial lighting should be sufficient to do the job alone. In new construction or major renovation, provide as many windows as possible which should be low enough to let the children see out. In nap areas, windows will need shades or curtains.*

Cohen indirectly raises the question of windowless buildings. Such buildings are not commonly designed for schools because of the ease of climate control and, in some neighborhoods, to cope with problems of vandalism.

There has been research on the effect of windowless buildings (Drew, 1971). However, the two studies cited dealt with high school students. One study indicated negative effects (Karmel 1965); another study designed primarily to study sensory deprivation indicated no short term effects (Myers, Johnson and Smith, 1968). In another study of the effects of

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windowless classrooms on elementary-aged children (Architectural Research Lab, 1965), the major effect observed was an attitude shift by teachers toward windowless rooms. Measures obtained for the children, e.g., school grades, attendance, etc. showed no marked differences.

Peller (reprinted 1972) suggests that windows and their use can be an important part of the curriculum:

> *Windows admit light and their coverings (blinds, curtains, or shutters) diffuse it. Both are needed at different times of the day. The room will usually be darkened for rest period. Occasionally a darkened room may set a better stage for a story period or for the game of "listening to all the little noises". A southern exposure and a bright orange or blue curtain will, when the curtain is drawn, fill a room with color and subdued light--a pleasant and quieting effect. In a one-story building a skylight of plain or colored plastic will admit additional light. Children love to look out of the window. This function of windows is as important as the admission of light and air. We must remember that the motionless child who is listening or gazing with all his might is mentally a very active person.*
>
> *Children like the experience of opening and closing a window. In homes this is usually a privilege reserved for adults. A nursery school window may have one or two small panes for the child to open without endangering himself.*
>
> p. 226

Willis and Riccuiti (1975) cited glass as a possible safety hazard.

> *Windows and mirrors should be made of shatterproof glass or protected by wide ledges or screens.*

New buildings for day care often are designed with glass doors and full length windows. Such designs are not popular with teachers who worry, both inside and outdoors, that a child may break a window. In addition, such placement makes it difficult to arrange the room and provide for toy storage. Also children inevitably touch the windows, and some teachers complain that they perpetually look dirty.

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Flooring

Specifications for type of flooring ordinarily are not included in licensing requirements. Available recommendations on flooring generally deal with safety or maintenance considerations rather than how floors relate to the program of a child care center. Child Welfare League (1973) presents a brief statement as follows:

> *Floors in rooms used by children should be covered with a smooth and splinter-proof material such as linoleum or asphalt tile. A highly waxed slippery surface is to be avoided.*
>
> p. 82

American Academy of Pediatrics has a similar statement.

> *Bare floors should be smooth, washable, in sound condition, and free from hazards. If carpeting is used, it should be properly cleaned and maintained and be fire resistant. Since many children's activities take place on the floor, floor coverings should be pleasant to touch, easy to maintain, resilient, water resistant, and quiet. Rugs or carpeting should be used in quiet areas, and different floor coverings can provide boundaries for different activity areas Both bare wood floors that have a tendency to splinter, and hard, cold, and noisy floors such as concrete and terrazzo should be covered indoors.*
>
> p. 57

Willis and Riccuiti (1975) caution:

> *There should be no slippery throw rugs in the room. Caregivers should wear shoes that give them a firm footing when they are carrying babies. Walking babies also should not wear slippery shoes.*

Osmon (1971) describes considerations which should underlie good design of flooring:

1. *It must be free of drafts and warm to the touch, to minimize the potential for colds and to maximize the child's comfort when playing on the floor.*

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2. *It should be easily maintained to minimize slipping hazards and to minimize germ retention.*
3. *It should be resilient to minimize accidents from falls and to minimize the floor as a sound-producing element.*
4. *It should be designed with a minimum of change of level along major circulation paths to eliminate places to stumble.*
5. *It should be considered for its potential as work/play surface to minimize the clutter of furniture and maximize the number of play/work postures.*

p. 50

Carpeting is popular with teachers because it cuts down on noise, especially with certain play equipment such as blocks. It also provides a warm pleasant surface to sit on. It can become a maintenance problem, as Osmon notes:

> *. . . spills and germ retention can be a problem. Teachers do not mind removing a spill on a resilient floor but will not get out the carpet cleaner after each spill. Since many Centers do not have nightly janitorial service for rug shampooing, the spill has a chance to "set", leading to a permanent stain, depending on the liquid and the carpet. A spill, if shampooed during the daily program, will leave a wet spot for several hours, producing an area which is unusable for sitting. The carpet underlayment or backing should also be considered for its potential for retaining dampness and germs. The retention of static electricity is also a consideration when choosing a carpet.*

p. 51

In Schools Without Walls (1965), the following experiences with carpets is described.

> *Whether to carpet throughout or leave patches of floor in strategic places with what is presumably a more utilitarian surface, is hard to say. But those schools that are totally carpeted have encountered no problems. With regard to both wetwork and other possible assaults on the soft floor, Principal Miriam Swett, of the Fairmont School, says: "It's been a surprise because it's been no problem at all and we've had every kind of childhood accident-bloody noses, wet pants, throwing up, spilt paint, and mud from the lack of landscaping. The custodians tell the teachers not to touch any of the spills. They have a special compound and they wait until a spill dries to clean it."*

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Dilworth, where the big room's fully carpeted floor is now in its fourth year, is still delighted with it. The only children's paint color that has refused to come out is violet. There, too, custodians let paint and other stains dry overnight before cleaning, though in the case of poster paints teachers sop up spills immediately with detergent and water. Teachers feel this mild inconvenience to themselves is more than balanced by the carpet's virtues.

On the matter of routine maintenance, custodians assert that it is easier to care for the fully carpeted floor than one which combines carpet and hard flooring, since different equipment and processes are required for the different surfaces. At Granada it has been found that custodians can routinely clean the 5,000 square feet of carpet in the big room in half the time it takes them to clean 3,000 square feet of vinyl-asbestos tile in the kindergarten cluster. Moreover, they save two days of labor every 90 days when the carpet is spot-cleaned and the tile is stripped of old wax, rewaxed, and buffed.

p. 46-7

The experience described here assumes that a maintenance staff is available. Such an assumption cannot be made about day care. Often maintenance is very limited and of poor quality. Unless a center is included in the maintenance schedule of a larger unit, there are often real problems in getting adequate cleaning of carpeting. The fact that the center is open 52 weeks a year also compounds the problem because there is no "down time" in which to do major cleaning jobs.

Over the years we have seen carpeting that looked exceedingly uninviting. It does spot and clean unevenly. In areas where there is constant heavy traffic or where messy materials are used daily, the problem of maintenance may outweigh other advantages. However, we know of no other single factor which contributes so markedly to the comfort of children and teachers. For children, it provides a soft, pleasant warm surface to sit and to play. For adults (and children, too) its sound-dampening qualities are a real asset.

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Throughout this section references have been made to the floor as a place where young children spend a major part of their time. In our observation studies, we found that the floor was a powerful organizer of traffic patterns - and that both indoors and out, variations in the surfacing led to better organization. Peller (reprinted 1972) describes a point of view about floors which tallies with our experience:

> *Today the usual arrangement is to leave one side of the room free or to keep the center part of the room unencumbered. It would seem better to provide several decentralized floor areas. A part of the room can be elevated with one or two steps. The very young child loves to practice walking up and down and all children love to sit on steps. Besides the steps leading to the platform, there might be a step leading up or down to one of the alcoves; or an alvove might be separated from the main room by a doorsill high enough to serve as a seat for a child. A good place for stationary steps is underneath a window. The children enjoy standing or kneeling there and looking out. Platforms, balconies, steps, and ladders are variations of the theme "floor".*

Color

One aspect of design on which there are many competing opinions but little hard evidence is the use of color. Theories abound on color's effect on the emotions and task performance, its correlation with personality and special influences on behavior, but there is no systematic data to guide its application to day care across individual situations. Environmental Criteria (1971) provides a summary of possible uses for color in day care environments. This summary is here presented in its entirety (pages 31-32).

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Color

Color can not only contribute to the beauty of a day care center, it can produce a psychological effect on the behavior of children. "Paint and especially carefully planned color schemes appear to influence the scholastic achievement of elementary school children, and especially those of kindergarten age." (105:430)

While the response to color is highly individualized and since it has not so far been possible to correlate specific color reactions to particular behavior processes, there are general responses to color which are widely accepted. Empirical studies have led to some interesting observations about color which are useful in understanding how color may affect the behavior of young children.

Design Considerations

There is evidence of increased activity, alertness, and outward orientation in the presence of warm and luminous colors, thus creating an environment which is conducive to muscular effort, action, and a cheerful feeling. (86:133) Red produced tension, excitement, and a feeling of warmth in controlled laboratory experiments, while blue resulted in a feeling of well-being, calmness, coolness, less anxiety or hostility, and less awareness or concern for outside noise. (84:31) "Behavior is increased or relaxed according to the type of color stimulation. Red and related colors activate; blues, violets, and green calm. Light colors activate; deep colors produce passive moods. Beyond this the exact hue or tone of color is fairly optional." (105:40)

"Young children are said to enjoy strong primary colors properly used. Children react strongly to color psychology and colors should be chosen purposefully. Color treatments should also be based on the use of the room as well as the length of time it will be used." (117:94) It might also be stated that the size of the surface area to be colored needs consideration — large surface areas being the pastel and soft hues with small surface areas being the strong bright colors.

Kenneth Bayes, reporting on experiments carried out by Oser, Brian, Goodenough, and others, indicates that perception of color over form is dominant in early childhood, with a general change in emphasis until form is dominant in maturity. Dominance of color awareness increases until four and a half years, after which age there is increasing recognition of shape. (84:38)

Color	Psychological Response	Advantageous Usage in Curriculum
Red	exciting stimulating defiant contrary hostile hot passionate active fierce intense happy sometimes irritating	outdoor play equipment indoor or outdoor gross motor activity cognition activities which require stimulation
Orange	welcoming jovial lively energetic forceful exhuberant hilarious disturbing distressful	entrance to a facility and/or classroom gross motor activity
Green	calm peaceful serene quiet refreshing restful	reading corner nap area eating area isolation room (if it is to be used as a "quiet room")
Blue	calm peaceful soothing tender secure comfortable melancholic contemplative subduing serene sad dignified restful	reading corner nap area eating area isolation room (if it is to be used as a "quiet room")
Black	despondent dejected ominous unhappy powerful defiant hostile strong	not recommended to be used in large amounts may be effectively used as accents in areas in which a child is to express himself
White	cool pure clean frank youthful	reading corner eating area health area isolation room administrative area

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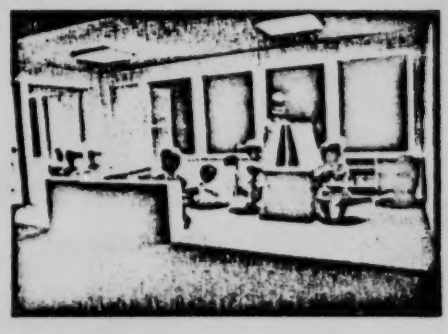
Color	Psychological Response	Advantageous Usage in Curriculum
Yellow	cheerful joyful inspiring vital	gross motor activity music corner art corner
Purple	stately dignified mournful mystical	reading corner may be effectively used as accents in study area
Gray	neutral non-respondent soothing	used as complement to other colors use as accents

The chart sums up the accepted psychological responses to colors and suggests their advantageous use in educational facility planning.

Contrary to what might be expected, there is reason to believe that with maladjusted children, excitable individuals respond more therapeutically to stimulating colors and withdrawn children to cool colors. (84:36) In other words, children respond best to colors which are in sympathy with their own emotional condition.



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Conclusions

Colors produce responses in children which need to be taken into consideration in the selection of colors for day care centers. Color selection should be based on the children's responses to color, the purpose for which the area will be used, the nature of the children using the area, and the size, light exposure, and other physical characteristics of the area. Personal color preference should also be considered, especially in spaces that are occupied for long periods of time by one person. This is particularly applicable in offices or similar spaces. Color can be used as a means of identifying a child's personal property, e.g., his storage space, his chair, his glass, etc.

Peller (reprinted 1972) observes:

> *The teacher has to feel comfortable in her room and it has to satisfy her aesthetic sense. The color scheme makes the room pleasant and cheerful for children and adults. . . . Colors certainly stimulate or have a quieting effect. Strong colors should be reserved for those things which we want the children to pick up and manipulate, e.g., toys and tools. For table tops, walls, shelves, and other large surfaces neutral colors are more advisable.*

In our experience color can be effectively used to organize and delineate activity areas. Imaginative use of color often becomes difficult in large bureaucratic systems where decisions about purchasing and policies governing painting are made in a central headquarters where economy and efficiency are the primary bases for decision making.

Wall Surfaces

Licensing requirements do not ordinarily refer to wall surfaces except for the admonition that they should be clean and free from toxic paint. New York (SER Abstracts, 1971) states that *Toxic paints or finishes shall not be used . . .* and that *Peeling or damaged paint or plaster shall be repaired promptly to protect children from possible lead poisoning and other hazards.* Child Welfare League (1973) states that *Floors and walls should be kept clean; they should be covered with materials that can be frequently washed and easily and inexpensively maintained* (p. 78). Cohen recommends:

> *Wall and floor coverings can add variety in color and texture to the environment. Painted surfaces should be light in color and nonglossy (though paint must not contain lead), or walls can be covered with heavy-duty washable wallpapers which are colorful and easily maintained. Bulletin boards placed at children's eye level are good for displaying art work.*
>
> p. 57

000038

Environmental Criteria (1971) calls attention to the importance of the tactile sense in the choice of interior surfaces:

> *Interior surfaces are an aspect of the environment which is rarely considered. One notices walls, floors, and ceilings, but seldom the materials from which they are made. Interior surfaces stimulate vision and the sense of touch. Of these two, perhaps the tactile sense is the most important for the preschool children, especially the very young and the retarded.*
>
> *"The sense of touch is constantly in use but sadly neglected. Even though the human being may cut himself off temporarily from sight or hearing by closing the eyes or plugging the ears, he can never in normal conditions be free of tactile sensation of the body on the surface which support it. Yet except when the cruder aspects of physical comfort or discomfort are involved, there is little consciousness of the sensations of touching the chair seat or the bed, or the desk on which the arms rest. The sensual life could be far richer if man became only slightly more aware of the tactile sense and, as a corollary of this, if architects more often used texture consciously as a design element - as a tactile experience and not just, as at present, visually." (Bayes, 1967)*

They summarize some of the basic considerations in planning wall surfaces.

> *Walls*
>
> *The walls of a day care facility are used for many things besides defining the limits of the rooms. The purposes for which the walls are to be used should be kept in mind when the material for them is selected. It should also be kept in mind that material or equipment being used in the program and placed on walls should be placed at child's eye level. This is true of windows as well as chalk boards and tack boards. A wall that is to be "worked" on should have a texture that is appropriate to its use and that has low maintenance and high durability. Unused wall surfaces require less maintenance and allow more freedom for textural expression.*
>
> *There should be many sorts of wall treatment in a preshool facility: smooth, rough, soft, and hard, each selected with as many purposes in mind as possible.*
> - *preshool facility walls need not have blackboards or bulletin boards, but there should be provisions for writing, drawing, and mounting of information on the wall surfaces*
> - *walls should provide a pleasing background for children's work, much of which will be vividly colore*

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- *tackboard walls and chalkboard walls permit teacher and children to utilize many areas for education and training purposes*
- *working walls should be selected for durability and ease of maintenance qualities*
- *walls and doors should be easily and inexpensively maintained, especially the parts that are within the children's reach*
- *the baseboard should match the wall to eliminate a strong band of brightness - difference at a location that falls well within the visual range of preschool children*
- *glossy surfaces should be avoided, both in natural materials or applied surfaces in order to avoid disturbing highlights*
- *trim may be used as an accent to wall surfaces, but should retain about the same reflection factor values to avoid objectionable brightness-difference*
- *paint finishes should be flat or matte on all large interior surface areas*
- *semigloss finishes are permissable on trim surfaces for accents and for areas where frequent cleaning is necessary*

Doors

The following two excerpts summarize many state codes' requirements for doors and door knobs:

As required by most States and localities, doors should open outward from rooms occupied by children. Door knobs used by children should be placed within their reach and crash bars installed when required by fire codes. Locks should be childproof - yet designed so that an adult can free any child locked in a room. If constructing or renovating, make doors wide enough to pass cribs and other wide objects. Omitting door jambs will make moving such equipment easier.

Cohen (1974)

Exit doors should have panic release hardware. At least two exit doors accessible to the children should be provided from each floor and from each room housing five or more children. These doors should open in the direction of exit.

Stairways for use by children should be equipped with handrails within reach of the children. Guards or gates should be at the top of the stairway.

American Academy of Pediatrics (1971), p. 37

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In our experience, the requirement of crash bars often presents problems in a day care setting, especially in smaller centers where the room opens directly to the outside area. In such cases crash bars often are the source of accidents because the height of the crash bar coincides with the head and mouth area of a preschool child. Children persist in hanging on the bars and their sudden release can give a child a sharp whack. This type of accident also occurs when children hang close to the teacher.

Another problem with crash hardware is that small children have trouble handling them independently. If doors are of the traditional type, they are heavy and hard for young children to get good leverage. Without the resistence of the closer, they fly open at a dangerously uncontrolled rate.

Another problem with panic hardware faces staff who work in storefront day care where the entrance opens onto a busy traffic artery. We have known of cases where inspectors concerned with child safety stated that the door knob must be at adult level and the door locked, while fire safety inspectors insisted that this same door have crash bars at child level and remain unlocked during business hours.

One of the problems with doors from an adult point of view is that children are fascinated by them. They really need to experiment with the concepts of "open" and "closed", "here" and "gone", "inside" and "outside", etc. Peller has made the following suggestions for creating these opportunities to explore:

With little expense a door can be inserted in the doll corner or a gate can be installed on the playground or indoors. One door can be constructed as a Dutch door, i.e., it is divided and the upper and lower parts open separately. The amount of experimentation, that is the alternate opening and shutting of the upper and lower part, indicates how much learning goes on in relation to "open" and "closed", or "connected" and "separated". After a time the playful repetitious handling gives way to an intelligent use at the appropriate occasion.

Children also love to pass things through an opening in the wall which can be closed with a door sliding sideways or upwards. Such a counter window with a shelf on both sides may be permanently useful in connecting the children's room with kitchen or workshop. The child who manipulates the Dutch door or the counter window establishes contact or withdrawal between himself and others. Here the perception of spatial relations and of social relations intertwine. This may explain the fascination which these gadgets hold for the young child.

Furniture

Licensing requirements for furniture seldom specify more than a general requirement for child size furniture.

Child size furniture shall be used. Each child shall be provided with a chair and table, either as a single unit or a table at which a group can be seated.

(Nebraska-Abstracts, 1971)

Child Welfare League (1973) states:

Furnishings such as tables, chairs, low open shelving, individual lockers for children's belongings, light stackable cots, play materials, and equipment for food service should be appropriate in height, size, and design for the comfort, health, safety, and developmental needs of the children in the group.

Standard operating practice is to provide a set number of child-sized chairs and tables based on enrollment. Osmon (1971) quotes an EFL bulletin which notes that one child plus one chair plus a table

equals 10 legs. He suggests alternatives such as sunken conversation pits.

Furniture for infant areas is also not ordinarily discussed in licensing requirements. Environmental Criteria (1971) comments:

> *While baby beds may appear to dominate the area, the room should be of sufficient size to hold several pieces of home type furniture, e.g., a rocking chair(s) and an upholstered chair(s), and provide sufficient floor space for crawling and walking practice. A play pen(s) is also desirable. Babies need to see the world from as many vantage points as possible: sitting propped in chairs, maneuvering on the floor, lying in various positions on their beds. Things to look at and reach for need to be around.*

In like manner, furniture for school age children has been given even less thought. School age children really enjoy couches, easy chairs and rugs after a day of sitting on hard chairs.

Peller (reprinted 1972) argues for diversity in types of furniture:

> *Indoor Furnishings. Several nursery school manuals give good detailed descriptions of the sizes and proportions of chairs, tables, and shelves, the main pieces of furniture. Usually chairs and tables in a nursery group are of two different sizes. This is a commendable practice although it does not always lead to our goal, namely to provide each child with a comfortable seat. Children will draw a higher chair to a lower table, and some children will always hunt for the larger sized furniture, although they cannot put their feet down on the floor when seated. The prestige of being taller apparently more than compensates for the discomfort. As the children do not remain seated for long periods, this does not matter and the teacher need not interfere. It is not advisable to use different colors for the different size chairs and tables. This will only make the larger furniture more conspicuous and more coveted. The light weight of a chair is important, for the child likes to carry a chair to different parts of the room or outside.*

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A nursery for 20 children requires 20 seats, but not all the seats need to be identical. Straight chairs, rocking chairs, armchairs, small stools, straddle-seats, a bench, and floor cushions (hard cushions covered with oilcloth or plastic) give variety. Some chairs will be more appealing than others. The variety will lead to little squabbles among the children. A child who never would have cared for the armchair will become eager to sit in it when he sees how much another child treasures its "possession". The ensuing negotiations, pleading, or violence are important social experiences and necessary in group adjustment. Chairs may be painted in two or three pastel shades or some may be polished wood or aluminum (plastic chairs have excellent contours and are less heavy than wooden ones).

Only in our western culture have we given up squatting or kneeling positions which bring us nearer to the floor than the average chair. Children like to sit tailor fashion on the floor, or to kneel on a flat cushion, sitting on their heels as the Chinese do. Both positions are healthful for the child. Flat floor-cushions match low tables, some of which may have hinged tops to prop up for painting or drawing.

Tables, too, should not be uniform. The majority will be the rectangular type seating two children. In addition, there can be a large table for 8 to 10 children. Large and small tables have their specific advantages and disadvantages. Large tables facilitate supervision. A group of children, each one working with the same material (clay, fingerpaints, paper) or on a joint project, is better off seated at one table. Interest is contagious and the enthusiasm of one child spurs the others. Individual tables discourage copying a design or a clay figure. Round or half round tables are practical for meals. They take up more space the number of children seated at one table is more flexible. One table may be a dropleaf table, or a small table can be hinged to the wall and dropped when not in use. Incidentally, silence domes on all table and chair legs are an asset.

The variety of chairs and tables plus the fact that some may be taken apart or folded instigate the child's interest in these parts of his daily environment. His attention is drawn to those qualities which constitute the "chairness" of a chair or which are indispensable in a table. The child's discovery is a source of great joy. Soon he tries his hand at making a table or a chair out of large blocks or empty boxes. This shows initiative and intelligence.

Most pieces of furniture can be used in several ways; they also can be abused. The child who is encouraged to observe

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and to experiment will soon be able to differentiate between use and abuse. All furniture for young children should be sturdy and well built and a certain amount of breakage must be expected. Children who are with well liked adults and who take an intelligent and active interest in their surroundings will rarely be deliberately destructive even when they are on their own.

Except for Peller, little thought seems to have been given to the function of furniture in a broader emotional, educational sense. Day care is not a school, it is a place where adults and children live together. For example, regulations do not provide that there shall be comfortable places for adults to sit. Couches and easy chairs are seldom seen in day care, except possibly in the staff room away from children.

One of the striking differences between family day care and center care is the difference in furniture. The furniture in homes provides for much greater differentiation of experience - there are kitchen chairs, dining room chairs, easy chairs in the living room, the "fancy chair" which is for guests only and the patio chairs which are made of tubular aluminum and can be carried and folded. In this sense family day care provides a much more richly furnished environment.

If group care were to move more in the direction of providing a more home like environment, this step would certainly be resisted by by many maintenance and purchasing authorities. These departments are geared to uniformity and efficiency. The unusual features that may endear a place to children and staff, often produce a surly maintenance crew.

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Storage

Licensing regulations do not ordinarily prescribe standards for storage except to specify occasionally, as does Michigan, that materials be *accessible to children.*

Child Welfare League (1973) states:

> *Adequate, accessible storage space should be provided for cots, extra supplies, emergency clothing, and teachers' supplies and belongings.*

Cohen's proposal (1974) is more specific:

> *Storage space, which is different from display space, should have doors-and locks and keys when there is any reason to keep children out. Supplies and equipment should be stored as close as possible to their point of use. Portable shelves or bins on casters are convenient for shifting activity areas and for dividing one area from another, although built-in storage is usually more sturdy and economical.*

Willis and Ricciuti (1975) propose some safety cautions in storing equipment for very young children, namely

> *.Place heavier equipment on lower shelves*
> *.Unstable furniture, for instance shelves, that a baby might tip over on himself or herself does not belong in a nursery*

Storage probably has not been given enough attention as a key factor in providing good day care. Adequate storage helps to guarantee (1) enough supplies for a good program, (2) safe places to keep things which should not be accessible to children, and (3) basic order. In our day care consultation (Rosenberg Grant - 1973-75) probably our most common first recommendation to centers who wanted to improve their program was to plan for better and more conveniently located storage.

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Osmon (1971) points out that two kinds of storage are needed; open and closed. If there is only closed storage, children will have little choice and probably not enough to do. Too much open storage often prevents the teaching staff from regulating the amount of choice they wish to give. Environmental Criteria (1971) recommends 80-120 cubic feet of enclosed storage per child and 12-24 cubic feet of open storage per child. They also provide excellent recommendations about storage for other aspects of the program.

Montes and Risley (1975) examined the effect of using shelves vs. toy boxes for storage for 14 black children, age 4-5, in a day care program.

> *In the shelf condition all materials were neatly arranged and clearly displayed. In the toy box condition all play materials were scrambled inside a large box. Observations were made during each three minutes of the play period. When manipulative toys were on shelves, children spent 3% of their time selecting and 85% playing, but under the toy box condition they spent 19% selecting and 69% playing.*
>
> *In the housekeeping area children spent about the same amount playing under both conditions, however, the toy box increased the time selecting and markedly decreased the time in cleaning up. In the block area there were no differences between the two conditions. In no area was there a difference in amount of time spent interacting with the teacher.*

They conclude that the use of toy boxes for blocks as well as for large items such as those found in the housekeeping area does not affect quality of children's play.

Montes and Risley did not take into account other possible outcomes of a more long range nature. We have often, in our observations, noted a child who sat 3 to 10 feet from an open storage area looking intently, then going over and carefully choosing materials. We have

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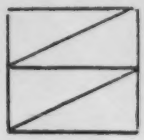
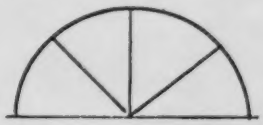
also observed children copying block storage patterns in their building play. Duplicating these patterns seems to have been facilitated by orderly storage:





Peller (reprinted 1972) also proposes an educational rationale for thoughtful attention to storage.

> *All material and toys should be accessible to the children without their asking the adult's help. Here again is the recurring theme: the nursery school should lessen the discouraging burden of dependency which in our culture is heavier than in others. The primary purpose of all equipment, toys and furniture is to provide an arena for the child to build intelligence, imagination, initiative, perserverance. Another important reason for making tools and play materials directly accessible to the child is: a young child's intention or plans are not well defined or fully conscious. He cannot put them into words with ease or precision. The layout of the nursery school enables him to translate into action impulses which are vague and fleeting. This, too, is part of the "self expression" offered in nursery school. To emphasize this point, we make a corollary statement: a child, for whom verbalization of what he wants to do no longer presents a hurdle, has passed the stage where he belongs in a "nursery".*
>
> *For children who are accustomed to find their materials in plain sight, things which have to be taken from a closed cabinet or from behind a curtain have a special attraction. Toys kept in a cabinet locked with a key have a particular appeal. Most young children are fascinated with a key which they can insert in a keyhole and afterwards return to its hook on the wall. Of course, a key which is so freely accessible to a group of youngsters will sometimes get lost, or be taken home by a child. One may argue: why should the teacher add another concern to her full day? There are so many things children like to play with, would not the teacher do better to concentrate her effort on satisfying the children's emotional needs? We do not say that a preschool child who has no chance of handling a key is deprived of an essential experience. Yet he does miss something. The more all "perishable" items, anything that can be lost, soiled, or pocketed, are removed from the children's reach,*

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the more grows their destructiveness. The teacher who looks for help in stemming the tide of carelessness which requires "eternal vigilance" on her part, will usually try to eliminate more and more things which can be broken, swallowed, taken home, or ruined in some way. But some times the opposite approach is more helpful; children are delighted when trusted with "special" things.

Certain types of order in the day care facility undoubtedly facilitate some learning. Plummer et al. (1973) found that when teachers straightened clothes of preschool children and "stored" them in the open, ready to be put on, the children were more successful in dressing themselves than when the clothes were left unstraightened.

In two of our studies (Prescott, 1975; Prescott and Milich, 1974), we looked at storage patterns in day care for preschool and school age children. Our measure was as follows:

Amount of storage

1. *No storage cabinets, no equipment*
2. *Sparse equipment, limited supplies*
3. *Basic equipment and supplies found in most centers*
4. *Well supplied, above average*
5. *Unusually large amount of supplies and equipment*

Availability of Storage

1. *Closed, not available to children*
2. *Some available, most closed*
3. *Some available, some closed*
4. *Most storage areas accessible*
5. *Everything out and available*

Order of Storage

1. *No order apparent, storage patterns unclear (For instance, a variety of different kinds of paper stacked together; or paper stored next to structured games and at some distance from crayons, paint sticks, etc.; or six different play materials distributed among 12-20 containers and dispersed on shelves.)*
2. *Some pattern apparent, but order not followed*

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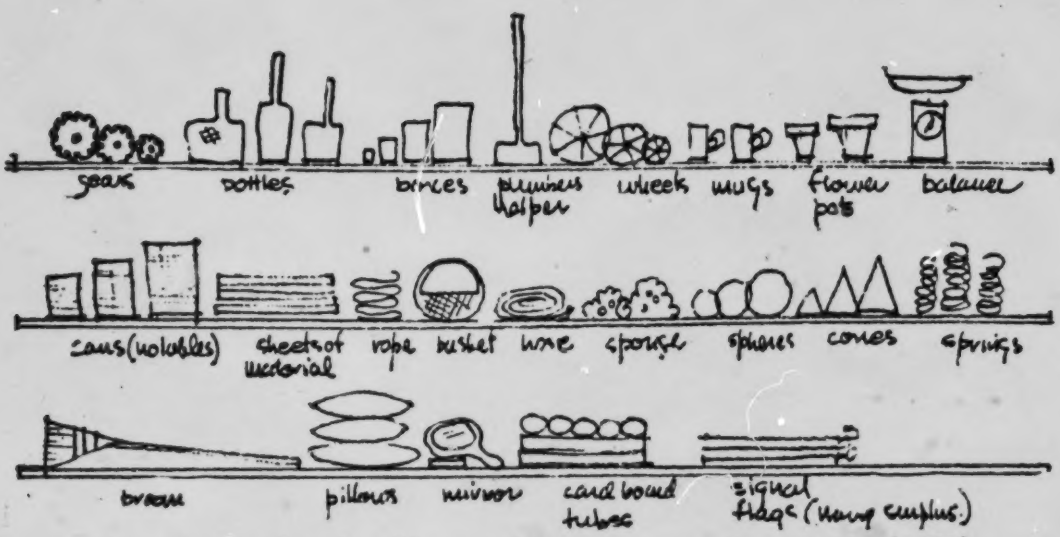
3. *Some order, some areas unclear or conglomerate storage*
4. *Basic organization clear, defined*
5. *Exceedingly well organized, everything has its place; boundaries within and between sets clear and look easy to maintain by children.*



A good example of well-organized storage. From Osmon (1973) p. 73.

We did not look at storage as a single variable, however, we did find that storage patterns were related to the program structure of a center. Centers which organized their program to give minimum choice to children in selection of activities had minimum and/or closed storage. Programs which were designed to give children choice in activity selection typically used open storage. To the extent that programs veered toward a *laissez faire* approach, storage tended to be hapahzard and disorganized.

A storage problem which is seldom discussed is the need for temporary storage of projects which carry over from one day to the next. School

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age day care, for example, often uses facilities which have other occupants during school hours. If children get involved in long range projects, an exceedingly desirable activity, they often have no place to put things. The absence of this type of storage often prevents any activity of this type from getting started.

Probably more attention should be paid to storage. We have found that storage patterns are very closely tied to overall spatial organization which we will discuss later in this paper.

Adult Places

Licensing standards usually require an adult toilet and sometimes specify a staff lounge. Beyond that little thought is given to the comfort of the adult.

Child Welfare League (1973) makes the following recommendations.

The center should have sufficient space to allow for efficient administration, staff and parent meetings, and comfort and privacy of both staff and parents.

There should be a reception room with comfortable furniture, toys for children, and reading material for parents and other adults visiting the center.

Office space is required for private interviews with parents and for conferences of staff members.

A comfortably and attractively furnished staff room should be provided for staff rest periods, and may be used for staff, parent, or board meetings. In a large center, however, a separate room may be needed for meetings.

Offices should have appropriate equipment such as telephones, desks, steel filing cabinets, typewriters, adding machine, dictating and duplicating machines, and storage space for office supplies.

When physical examinations are given in the center, a special room should be set aside and properly equipped,

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lighted, heated, and ventilated. Additional office space may be required for conferences between doctor or nurse and parent.

Cohen (1974) suggests:

The amount of space needed for adults depends on the type of program and on the degree of involvement and other community functions which take place at the program site. Even a small program with a small staff needs a place for staff members' personal belongings, an office with desk and file space, an adult rest room, and at least one room available for parent conferences and small meetings. In addition, adults who work closely with children for long hours need a place for privacy and relaxation. Depending on the size and scope of the program, additional space may be needed for more offices, a conference room, a staff lounge, an observation room, or community areas.

Many programs have a small room for parents near the entry area which they can use when they bring or pick up their children or when they visit. This room helps make parents feel more welcome,especially if coffee is available and if they can talk with staff members here.

As stated earlier when we were discussing furniture, the importance of the space for teacher comfort seems to have been overlooked. Most adults in day care spend little time in the adult lounge. They need comfort out where the action is - with children. Nursery size straight back chairs do no provide a particularly relaxing seat for adults.

Peller makes some important points about teacher space.

The teacher needs some place where she can keep things not intended for the children. A regular desk takes up too much precious floorspace. We have found a cupboard receding unobtrusively into the wall a very good solution. In a room for a group of active children, an adult's furniture should not take up space. While we feel this way about a desk, we would like the teacher to have a comfortable chair where she can sit without cramping her knees. Her work is physically tiring. She is on her feet for many hours. A few minutes relaxation in an easy chair can do much to restore her resilience. When

she leans back in her easy chair, her eyes are at the level of the children's eyes. She has a better vantage point for observing the active community than when she stands up and "looks down" on them. But the teacher's big chair is even more important as a haven for the children. It is a special treat to be invited to sit there and look at a picture book, or an upset child will snuggle into the chair and watch the others for awhile from a safe distance. As a rule, at first a child is fascinated with all the furniture which is just his own size, but the sight of so many other children may be frightening. In this case the big chair carries the message that there is a comforting adult in the room. A comfortable chair should be part of the standard equipment in a place where children and an adult live so closely together. Of course the teacher will take on her lap a child who asks for this either by word or deed. However, when she is too busy with the group, then sitting in her chair is the next best "Ersatz".

Bathrooms

Specification of the number of toilets is the recognized prerogative of all licensing departments. According to the Consulting Services Corporation Report (1971), state requirements for toilets/washbasins have the following distribution:

one toilet/basin to 7/8 children	4 states
one toilet/basin to 10 children	22 states
one toilet/basin to 12 children	4 states
one toilet/basin to 14/15 children	13 states
one toilet/basin to 20 children	5 states

Four states make some differentiation between children under and over the age of six. In California where the ratio is 1:14 for the first 14 and then 1:10, we have never heard anyone suggest that this number is insufficient; however, people have suggested that three toilets is sufficient for the 35-40 child range.

Child Welfare League (1973) suggests the following standards:

There should be one toilet and one wash basin for 10-15 children, with separate toilet and handwashing facilities for adults.

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Each group, regardless of its size, should have at least two toilets and two wash basins.

Toilets and wash basins for the children should be permanently installed and secured, and should be of appropriate height for their health, comfort, and developing skills in caring for themselves.

Toilets and wash basins should be directly accessible to the playroom and to the outdoor playground.

Separate facilities for boys and girls under 6 years of age should not be required.

Each child should have his own towel and washcloth.

If nondisposable materials are used, they must be kept in a sanitary condition and hung at the child's height, with sufficient space between to prevent them from touching.

Water used by children for washing should have an automatic control to prevent the temperature rising about 120 degrees.

Academy of Pediatrics recommendations are similar.

Inside toilet rooms should be located on the same floor as the inside play areas, and in close proximity to inside and outdoor play areas. Toilet rooms should be equipped with flush toilets and securely fastened and supported wash basins with hot and cold running water. The toilet rooms should be scrubbed and disinfected daily. There should be a minimum of 1 flush toilet for each 15 children and staff members who are using the facilities. Nursery seats and steps or platforms should be provided for the use of young children, to encourage self-help and independence.

Privies, in accordance with local health department requirements, may be used when water-carried sewage disposal is not available or feasible.

A sturdy table should be provided for changing diapers. It should be of appropriate height and easy to clean, and be provided with disposable paper sheeting.

p. 38-9

Cohen (1974) suggests a 1:8-10 ratio:

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Ideally, all equipment should be child-sized and available to children at all times, and both indoor and outdoor toilets should be provided. Very few programs are able to provide outdoor toilets, however, and preschool children usually do quite well in standard adult facilities which they use at home.

Preschool programs should have at least one toilet and sink for every 8 to 10 children. While separate facilities for boys and girls are not necessary, adults' toilet facilities should be separate from children's. Toilets for preschoolers are ideally 11 inches high. If adult-sized fixtures are used, platforms or small benches on which the children can stand should be added. A bathtub is a special convenience for daytime programs but may be more necessary for nighttime care. Tubs, toilets, and washbasins need traps to permit easy removal of clogging objects such as sand, toys, and paper towels.

The facilities should have easy-to-clean walls, floors, and fixtures - bare concrete and unfinished walls should be avoided. Mirrors, paper towel holders, and hooks should be within easy reach of children, and paper towel dispensers should be located away from toilets. Bright colors, varied textures, and good lighting and ventilation will make the area more pleasant.

Osmon (1971) cautions that seamless flooring is needed to prevent water damage, odor and/or germs that might result from seams in the tile flooring.

Ann DeHuff Pieters (Models for Day Care Licensing, undated) has questioned the need for child-sized toilets:

Child-sized toilets and washbasins are expensive, are not like those in the child's own home, and are unnecessary. A small child learning bowel and bladder control can use the small potty-chair more comfortably and, as he grows older, with the aid of small step-stools will climb up onto a large-size toilet backward. Step-stools can also be used.

The question of toilet size is often important where facilities are to be remodeled, because of the cost factor. Staff find child size toilets somewhat more convenient - although in programs which have

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both child size and regular toilets, children often are attracted by the difference, and much conversation revolves around which is chosen.

Although there must be a rationale underlying proposals for numbers of toilets, we have never located anyone who could explain it. Perhaps the biggest problem area in regard to standards for toilet facilities is in regard to school age day care. There seems to be common agreement for sound developmental reasons, that older boys and girls should toilet separately. Beyond that there seems to be little agreement about numbers of toilets or their relation to preschool facilities. We relate our experience with the State Department of Health in California when we inquired about toilets for school age day care (Prescott and Milich, 1974):

> *Here again despite my careful explanation it was assumed that the category I was describing would fall under schools. I was told that for schools there must be one toilet for each 100 boys and one urinal for each 30 boys. For girls, there must be one toilet for each 35 girls. These must be separate toileting facilities.*
>
> *I then explained that I was not talking about school, I was talking about before and after school care for school age children. The requirement for this type of care is a separate lavoratory and toilet for each sex in the ratio of one toilet to each 15 children. I asked why there was such a discrepancy between the standards required for schools compared to day care. He said he didn't know what the foundation for this was, that probably these figures are the same as those which hold for organized camps which house children twenty-four hours a day. He said that this seemed a bit high when compared to schools, but that the figures probably were lifted from camp standards.*
>
> *I then asked about the requirements of separate toileting facilities. I was told that children six and older must have separate toileting facilities and that these could not be used by preschool children. I said, "Does that mean that a four year old and a six year old could not use the same toilet?" He agreed that this seemed a bit unreasonable*

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and said that he did not know the reason why this was required. When I asked him if this also meant that if there was only one toilet, and it was a private one, that it could not be used by boys and girls, one at a time, as would be the case in a home. He re-read the code and was somewhat uncertain, but suspected that inspectors would insist that it be separate.

He ended our discussion by saying that "we have archaic codes and will have to redraft all of them." To his knowledge they have not been revised in 30 years.

p. 10

In regard to design of bathroom facilities, we are surprised at the lack of attention given to this crucial area. Bettleheim (1974) has described the importance of making the bathroom a comfortable and pleasing place for both children and staff. Often in our experience, bathrooms have a strong negative effect on a day care program. Economy of construction tends to dictate the location of the bathrooms in one central area instead of dispersed facilities located in separate group areas. When toilets are poorly located, very careful thought must go into planning bathroom use. Teachers will be handed toileting schedules and children ordinarily will not be free to come and go according to individual need.

Bathrooms are often planned to be small and efficient. As a result, much of the teacher's energy will be directed to "keeping the show on the road" and snuffing out any illicit water play or questions about anatomical differences. The old Lanham Act Centers in California had large bathrooms with windows and often long benches for sitting. We were struck with the relaxed tempo which this light, roomy area seemed to promote. The teacher often sat down, relaxed, and gave children help and individual attention. The children enjoyed a bit of

water play and the pleasure of some time with pants off. Once this type of bathroom disappeared, we no longer saw much of the behavior that went with it.

There are differing opinions about the importance of providing privacy for young children in bathrooms. In our experience, there is always a child or two in any group of preschool children who feels more comfortable if some modicum of privacy is available. Permitting children to toilet at any time facilitates privacy. Also a light weight moveable screen can be made available.

Some people are enthusiastic about providing specialized bathroom fixtures, such as urinals or a Bradley-type basin (a circular fixture used in industrial bathrooms). We question whether the expense is justified. Very young children are just learning the common ways of the culture - its variations seem to have little educational value and do not seem to markedly increase the efficiency of the setting.

Even the day care manuals which profess to "tell all" do not seem to discuss the problems of maintenance in toileting areas. Many centers find that if bathrooms are to be kept as clean as they wish, teachers have to do some tidying of the area. Probably more attention should be given to simplify ways of insuring regular maintenance.

Sleeping Areas

Most state licensing codes provide that a rest period shall be provided, for example:

That a washable cot shall be available. (Michigan)

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Individual cots or adequately insulated and protected bedding... (Hawaii)

Most codes specify that each child shall have his own sheet and blanket. Space between cots (varying from 2 to 3 feet) often is specified.

Child Welfare League (1973) states that preschool children should rest on cots during part of the afternoon even if they do not sleep.

Cohen (1974) advises:

> *Every preschool program of a half day or longer needs nap facilities. If space and money permit, a separate room where cots can remain set up is most convenient; if not, stackable cots can be distributed in the classroom or playroom. In either case, lighting and noise should be controlled. Before buying or renting cots, bedding, or storage racks, be sure to check State and local health requirements for bedding and rest facilities.*

American Academy of Pediatrics (1971) calls attention to the usefulness of light control.

> *Adjustable shades or curtains should be provided and used for protection from glare and to promote an atmosphere conducive to sleep at any time of day.*
>
> p. 37

Twardosz, Cotoldo and Riseley (1974) experimented with the effect of a closed off vs. an open, unprotected area on the sleeping patterns of infants. They found that an open environment did not adversely affect the sleep of either infants or toddlers (although 80% of the staff preferred a separate room for sleeping).

Willis and Ricciuti (1975) caution that *crib slots no more than 2-7/8 inches apart - rails at least 26 inches high and hardware with smooth edges*. Wooden cribs are awkward and difficult to store when not in use. More information about alternatives to the traditional crib would be useful. In addition to possible safety hazards, some people feel strongly that cots are clearly preferable to mats. According to our observations

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children sleep equally well on either. We do not know of studies which might indicate that cots are healthier or more sanitary.

A common problem reported in a session on Environments at an Infant-Toddler Institute held in California was noise during sleep time. In both family based and center care, people reported that children who were not sleeping often disturbed infant-toddlers during nap time.

The presence of school age children often creates problems in providing for rest time. Many school age children do not want to take a nap and are miserable and humiliated if this is required. However, some children, even eight year olds, need a chance to relax and unwind. Child Welfare League (1973) notes:

> *School-age children who need an afternoon rest period should be given a quiet place to relax and lounge, or a chance to lie down without undue attention.*

They do not report on the square feet per child ratio in this program.

Another problem with sleeping arrangements is found in family day care. For family day care, Child Welfare League (1973) states:

> *Each child under 6 years of age should have an individual bed or cot, kept in clean and sanitary condition at all times, with adequate bedding suitable to the season.*

Most homes provide a crib or special bed for infants, but often they spread a sheet or quilt over the bed of a family member for the nap time of older children. We see no objection to this arrangement.

Kitchens

Kitchen regulations typically spell out compliance with health regulations:

> *Kitchen facilities should be sanitary, orderly, well lighted, well ventilated, conveniently located in the building, and properly equipped for service of food to groups of children.*

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The kitchen should be separated from the playrooms, yet located so that food can be transported readily and served while hot.
Provision for refrigeration of perishable foods and sterilization of dishes and cooking utensils, and a sanitary method or disposing of garbage are basic requirements.
An adjacent storeroom, properly equipped for staples and canned foods, is essential for good management and hygiene.
The kitchen should have separate areas for food preparation, cooking, serving, and cleanup.
Walls and floors of rooms where food is prepared and stored should be easy to keep clean. A sink for handwashing should be accessible to kitchen staff.
The agency must be in compliance with local health regulations covering food handlers and the care and service of food to children in groups outside of their own homes.

Child Welfare League (1973)

Cohen (1974) specifies:

Kitchen size and equipment will depend on the number of children served, the type of program, and the type of food service. If the program does not require meals, a "snack kitchen" with a refrigerator-freezer, storage space, utensils, and a hot plate will provide snacks as well as some educational cooking experiences for the children. If meals are prepared in an outside source, the day care site may need only a "satellite kitchen" with warming ovens, refrigeration, serving equipment, and dishwashing facilities. But if full meals and snacks are to be prepared at the site a full range of equipment should be installed - refrigerator, freezer, stove and oven, dishwashing equipment, cabinets, and storage areas. Whatever the type or extent of the food service, kitchen equipment must comply with local health and sanitation regulations, and the kitchen should be separate from the dining area, though close enough for convenient serving and cleanup.

Undoubtedly it is essential to spell out regulations for food handling. However, we feel that it is important to differentiate between the requirements of a small center (under 50 children) serving a simple menu and those established for large commercial restaurants.

Most regulations assume that children will not and should not be near the kitchen area. In fact, most kitchens that we know of are

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closed off from the children's area. A complete separation of kitchen from the lives of children may be inevitable in centers where food service is done on a large scale. However, some of the nicest moments which we have seen in day care are those where children could perch in safe places and watch, talk with or even help the cook. Good kitchen design can keep children safely away from dangerous areas and still not entirely close off contact between food preparation and the eating of food.

Food and the people who provide it have special meaning for young children. In family day care, children are not separated from the preparation of food as are children in most center programs. We have been struck by the quality of the conversation which occurs in family day care kitchens.

Other Indoor Spaces

Isolation room. The provision of an isolation room for children who are ill is a long-standing requirement cited in the Licensing Codes of most states. Often it is described as a more elaborate area than it appears in practice.

> *A special space should be available for isolation of children when emergency illness occurs, or when they may need to be by themselves.*
>
> *This space should be located close to a staff member so that the child will not feel that he is alone. It may be adjacent to the office assigned to health staff, or in the room used for first aid or physical examinations. In a small center, it may be a corner in the office of the director, social worker, or secretary.*
>
> *If first aid supplies are stored in the space used for isolation, they should be kept locked.*
>
> *Toilet and lavatory facilities should be easily accessible to the space used for sick children.*
>
> Child Welfare League (1973)

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A room for isolating sick children should be separate from activity areas but not so far away that the sick child will feel lonely or that supervision will be difficult. This room should be pleasant and bright and should have a cot or bunk and access to toilet facilities. First aid equipment and medicine can be stored here under lock and key, and the room can be used for examinations, immunizations, and other medical activities.

Cohen (1974)

As Child Welfare League notes, it often consists of a cot in the director's office - or by her desk. Another common alternative is to set up a cot in the corner of the playroom (the one nearest the bathroom if the child has an upset stomach). We have seen centers where a specially designed isolation room was seldom used because it was "too isolated". Most day care staff are pessimistic about preventing exposure of other children to the illness by use of isolation. They feel that, by the time a child shows symptoms, the exposure has already occurred.

Cubbies. That each child should have a cubby (personal storage place) for his clothing and personal belongings is considered standard operating practice in day care. Since cubbies provide a certain amount of privacy and a piece of individual territory in settings where most things must be shared, it seems that they should be important. In most centers they provide a useful place for parents to retrieve their children's belongings and possessions. Like school lockers, they easily become messy and we have never developed great convictions about the superiority of one design over another.

Really good cubbies probably are much more important for school age children. Older children have a much stronger sense of rules about possession and need to feel that they can exert some control in this

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area. Also they have important papers, like homework and notes from teachers, which need to arrive safely home.

Entry area. Cohen (1974) calls attention to the usefulness of a well-planned entry area.

> *It is useful to have an area where children can make a transition from the outside, where they can say goodby to their parents and can see what is going on inside before plunging into program activities. Here, each child should have a hook or cubbyhole for outdoor clothing, and there should be separate space for adults' coats. This area should be pleasant - perhaps decorated with children's art work or flowers. If space permits, it may contain comfortable chairs and tables where parents and staff can talk informally over coffee.*

Most of the entry areas we have seen are of two types; one simply opens into the room and the parent inevitably sees the adult in charge and gets a flavor for what is happening. The other is a reception area with no view of the play areas. The problem with a reception area is that often the parent goes no farther. The child is received and retrieved by the person on duty and contact between parent and teacher may be almost non-existent.

A nice design for an entry is one where windows and doors open onto all of the play areas. Parents can see their child from this area and also meet with other parents, visit and catch up on the center news.

The Shape of the Indoor Play Area

Cohen (1974) notes that

> *The shape of a room can affect the activities in it. For example, a long, narrow room encourages children to run and slide. Its tunnel-like appearance - if it is undesirable - can be minimized by placing interest areas at each end, by arranging equipment to break up straight pathways, and by conducting activities in the center of the room.*

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In our experience, it is the square which causes problems (Kritchevsky in Prescott and Jones, 1967). We found that overall spatial organization tended to be lower in both square rooms and square outdoor yards. The problem appears to stem from following the standard practice of organizing interest areas along the perimeter of the room. If the space is square this leaves an empty or "dead" space in the center which seems to collect unoccupied children as they "bog down" in attempting to move to another activity. Square areas probably need to be developed from the center outwards.

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III

BASIC DESIGN FEATURES - THE OUTDOOR ENVIRONMENT

Thirty-six of 50 states require a daily period of outdoor play. Licensing regulations also typically establish a required number of square feet for outdoor play space. Occasionally they specify, as does Hawaii:

> *The outdoor space shall be fenced and protected, with the entire area easily supervised. It shall be well-drained with both sunny and shaded areas.*
>
> Licensing Abstracts

In this section we will not discuss square footage requirements, types of equipment or questions of safety. However, in developing a yard, there are certain design features which are useful to keep in mind.

Child Welfare League (1973) makes a clear statement about the purpose which the play area should fulfill in day care.

> *Outdoor play is not only important for the child's health, but it is an integral part of his learning experiences. Outdoor play space should offer opportunities for adventure, challenge, and wonder in the natural environment. The day care center that cares for children during a major part of the day needs a playground of its own. It should be planned with flexibility and imagination so that growth and learning can take place within it, and it should be suitable for the particular climate and urban or rural location.*

They go on to recommend these physical requirements:

> *The play ground should be safe and comfortable, with a surface suitable for the activities that will take place on it.*
> *The playground should be well drained and, if possible, should have a surface of turf; approximately one-quarter of the area should have a hard surface for use of wheel toys.*
> *The playground should have a shady area, provided either by trees or awnings, and a covered area for inclement weather.*
> *Even if the playground is on a roof, a space for digging and planting should be provided.*
> *A playground should have access to a safe source of water and to toilet facilities.*

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The playground for preschool children should be protected by nonscalable fencing, at least four feet high; if the playground is on a roof, the fence should be seven feet high.

The Location of the Outdoor Play Area

Child Welfare League (1973) recommends

The playground should adjoin the building and be directly accessible to each playroom, so that indoor and outdoor play can be interchangeable.

School-age children may use community facilities for outdoor play.

In our experience direct indoor-outdoor access is very important in both center and family day care. When such access is not provided, a large amount of transition time is needed to get children in and out. Also, the play area, if spatially isolated, often is not well-developed and provides little to do.

Outside doors which open onto a small porch with a narrow steep flight of stairs down to the yard are a nuisance.

Noise Level

We have seen two problems which arise concerning noise level. One is that noise in the outside area is seen as a distraction to nearby classrooms or to sleeping areas. The other problem arises from excess noise due to poor location of the facility near major traffic arteries, freeways or airports. In a few centers where we have observed, noise and air pollution seemed so serious that we have wondered about possible hearing impairment or excessive carbon monoxide, lead levels, etc.

Climate Control

Since temperature in outdoor areas varies markedly throughout the day, a functional outdoor area needs both shady and sunny areas. A

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common problem which we have observed, particularly in centers under FIDCR jurisdiction (in California such centers are often housed on elementary school playgrounds) is a total lack of shade in the completely asphalted outdoor area.

Ground Cover

One of the major issues in setting up the outdoor environment is the decision about ground cover. The best summary of advantages and disadvantages of a variety of surfaces are summarized in a National Safety Council pamphlet (see pages 64-67).

We have included this pamphlet in its entirety because it provides the reasons which are most compelling to administrators who commonly make decisions about ground cover. The National Safety Council's experience is based on data from school playgrounds. Such areas experience much heavier and higher density use than most day care centers. In addition, the purpose which the outdoor area serves in day care is quite different from that of the elementary school. We found (Kritchevsky in Prescott and Jones, 1967) that yards which had several types of ground cover - a common example would be grass, asphalt and sand - had better overall organization than single surface yards. Apparently the change in surface texture acts as an organizing boundary.

Polly Hill (undated) describes experiences which are similar to our own.

> *According to Lady Allen, no one has yet discovered the ideal surface for a playground. The combination of grass and paving seems the obvious compromise. I saw a playground in New York that used a large variety of surfaces, supposedly to provide the child with experiences in texture and design. The surfaces were, in fact, lethally combined. Sand next to concrete paving*

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safety education data sheet no. 74
revised

PLAYGROUND SURFACING

Accident Statistics

1. Of all the school jurisdiction accidents reported to the National Safety Council during the past decade, approximately half occurred on school grounds. It is impossible to state what proportion of the resulting injuries can be attributed to surfacing. But it is equally impossible to assume that the surface on which the injury occurred can be excluded as a factor in the severity of almost any case.

2. It is difficult to ascertain whether an injury from a fall might have been more or less severe had the victim landed on another surface, and experimentation is, of course, limited largely to analyses of mishaps occurring on various surfaces. But tests indicating the resiliency of one substance, and the lack of "give" in another, lead to the conclusion that surfacing is an important factor in accident severity.

Criteria for a Satisfactory Surface

3. No matter what surface is selected for a given play area, it should have the following construction and maintenance features:

a. The surfacing material selected for a given area should be adaptable to the purpose for which the area is to be used. Hence, in view of the difference in recreational and physical education activities at various age levels, the surfacing most appropriate for the high school differs from that of an elementary school playground.

b. The surface must be constructed so as to provide for adequate drainage. Surface drainage can be accomplished through grading: a two per cent grade on a non-paved surface and a five-tenths per cent grade on a paved surface are considered optimum. A slope exceeding three or four per cent may cause eroding of an unpaved surface and result in excessive dust. Of course, all surfaces depend to a great extent on sub-surface structure. Not only climatic differences but different subsoil make it necessary to construct surfaces carefully.

4. Provision for underground drainage is also necessary in connection with many surfaces. A porous subsoil and drain tile facilitate underground drainage.

The surface must be well cared for so that:

a. It is smooth and free from ruts or bumps.

b. It is free from dangerous debris, such as bits of glass and metal.

c. It is kept clean from substances causing the surface to be slick.

d. It is apportioned and clearly marked to indicate playing fields and danger areas near games and equipment.

e. It is free from mud.

f. It is free from excessive dust.

g. In climates of extreme temperatures the weather factors do not affect the surface, nor do the surfacing materials add to the heat or cold.

Asphalt

5. Asphalt is probably the most widely used surfacing material on play areas. It is used as a surface, as a sub-surface over which is laid a material of greater resiliency, or, in some forms, as a base over which is laid a sub-surface and then a surface.

6. As a surface, asphalt commonly is laid to a rolled depth of several inches, over a sub-surface and a leveling base or course. Emulsified asphalt or asphaltic concrete is sometimes used in the sub-surface over which the final surfacing is laid.

National Safety Council, 425 N. Michigan Avenue, Chicago, Ill. 60611

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7. Thought by many to be the most ideal general-purpose surfacing yet devised for playgrounds, the common blacktop surface has many advantages. It is durable and maintenance is comparatively inexpensive. If laid properly and water-tight, the surface is firm, dust-free, relatively non-abrasive, and drains quickly and well.

8. Major disadvantages are initial surfacing costs and, according to some, a lack of resiliency. However, construction costs can often be reduced through the use of stabilized soil as a base for the surface. Even in localities where soil properties preclude this saving, initial construction costs may be offset by the low maintenance costs involved in caring for the finished surface.

9. The charge has been made that blacktop surfacing contributes to the severity of playground injuries. The difficulty of analyzing and, particularly, of comparing even as few as two accidents producing like injuries, makes such a conclusion highly tentative—at least until detailed records involving considerable accident experience can be compared.

10. Under conditions of extreme heat, some softening of the asphalt surface may occur. And if it is flooded for ice skating in extremely cold weather, the surface may suffer unless it is watertight.

11. Asphalt surfacing has been widely applied because of its general utility. It is recommended for areas of intensive and year-round usage. As a surface for general play areas it is widely used on elementary school playgrounds, but is particularly suitable for low-organized games. The fact that asphalt surfacing can be marked with a comparatively high degree of permanency should be viewed as an important contribution to the safety of those using the play area.

12. Cement, as contrasted with asphaltic concrete, is rarely used as a surface for the entire playground.

13. The excessive initial cost of concrete surfacing is a major disadvantage. This expense is balanced, however, by the low cost of maintenance. A cement concrete surface has good drainage properties, and comparative evenness and smoothness irrespective of extreme temperatures.

14. Its hardness and lack of resiliency, however, greatly curtail the general utility of concrete surfacing. To the degree that lack of resiliency is a factor in accident severity, the use of cement concrete must be limited.

Natural Soils

15. One survey showed earth to be the most widely used surfacing under apparatus, in public parks and playgrounds. Both as a surface under apparatus and as a general surface, it is used more often for economy rather than choice.

16. The obvious advantage of using an earth surface—i.e., adding no surfacing material—is economy. This savings is not permanent, however, because maintenance costs are likely to be high: plain dirt, as a surface for a frequently-used play area, lacks durability and smoothness, is often beset with drainage difficulties, and becomes rutted.

17. Other disadvantages in the use of an earth surface are dust—which may be combatted through calcium chloride or other chemical or oil treatments—and such health problems as tetanus, ringworm, and various infections.

18. In general, natural soil is either subject to excessive dust or to dampness. The sandier the soil, the more subject it is to dust. On the other hand, soil with a high clay content dries very slowly, and is extremely slippery when wet. Ruts, footprints and other tripping hazards tend to bake into the surface as it dries.

19. In many localities, shortcomings of the natural soil are overcome through the addition of sand or clay. For example, to a sandy loam, which has the advantage of resiliency but is subject to dust in dry weather, a carefully determined proportion of clay may be added.

Sand-Clay

20. Because of cheapness and widespread availability, a sand-clay mixture is sometimes used as a surfacing material, under apparatus, on ball diamonds, tennis courts, etc. Such a mixture is subject to the over-all shortcomings of its two components.

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21. Although initial costs are comparatively low, considerable maintenance effort is necessary to overcome the effects of rain, or to combat dust. In addition, sand-clay mixtures have been found to cause considerable wear on shoes, clothes, and athletic equipment. The mixture does not provide a surface of much resiliency, is somewhat abrasive, may introduce drainage problems, and presents a problem in maintaining cleanliness.

22. Sand-clay is sometimes combined with crushed stone to form a surfacing material. Disadvantages include a lack of resiliency, or firmness, and of smoothness—leading to a lack of general utility.

Tanbark and Similar Material *

23. Under certain types of apparatus, from which falling or jumping may be frequent, it is particularly desirable to have a resilient surface. Spent bark or tanbark, sawdust, shavings, and in some areas, straw or grain husks, are often used to provide this resiliency. Such surfacing material is often placed under horizontal bars and ladders, slides, and climbing structures.

24. When used as a surface under apparatus, tanbark is mixed with sand: 80 per cent tanbark and 20 per cent sand are the usual proportions. A mixture of equal amounts of coarse sawdust and sand provides a frequently used substitute for tanbark surfacing. Used under apparatus, both the tanbark and the sawdust mixtures should be four to six inches deep.

25. The materials listed in this section are available at low cost in many parts of the country. Installation is not expensive, usually involving only the cost of providing a curbing, or digging out a shallow pit for the surfacing material.

26. Maintenance needs, however, are constant. The filling should be kept loose and level, and must be supplemented frequently—especially when there is no curbing. Sub-soil drainage is important, as dampness tends to pack the surfacing mixtures and reduce or eliminate resiliency. Keeping the mixture clean requires considerable maintenance effort. Tanbark, in particular, is hard to keep clean. It is thought by many, however, to be more easily maintained than sawdust mixtures.

27. Turf is generally thought to be the most ideal surface for a playing area. Prohibitive maintenance features make it practical, however, only for limited areas such as those devoted to contact sports—where a high degree of resiliency of the surface is essential.

28. In addition to resiliency, turf offers the advantages of being dust-free, not subject to heat effects, and non-abrasive. It causes less wear on clothes and equipment than any other surface.

29. The disadvantages of turf include a fairly high initial cost, and excessive maintenance. A turf surface is not durable nor firm, and may offer drainage problems. And it is extremely slippery when wet.

30. It is impossible to maintain a turf surface on areas of intensive usage. The surface is usually unsuitable for use during periods of thaw, or after rain. In addition, it is necessary that a turf surface be given periods of rest, when it can be restored. The climate and maintenance limitations on its utility preclude using turf for the entire playground.

Stabilized Soils

31. Where turf is impractical or cannot be grown, the natural soil can be stabilized for the same type of general use for which turf is desirable. Of course, stabilized soil surfaces do not have the resiliency of turf.

32. Asphalt, resin, and cement are the three soil stabilizing materials most widely used as binders for natural soils. They are either applied directly to the loosened soil, or are thoroughly mixed with it and the mixture is then spread. The resulting surface may then be used as is, or may serve as a sub-surface for a layer of a more resilient surfacing material.

Composition Surfaces

33. In the search for playground surfacing material which would satisfy all of the general criteria, a number of composition surfaces have been devised, and many are now being marketed. A major aim in the application of these surfaces has been to add a greater resiliency to the advantageous features of asphalt surfacing.

* Ground walnut shells have been reported to us as a good ground cover, especially in damp areas. Sand is commonly used as a ground cover under climbing equipment.

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34. Many of these composition surfaces are laid on an asphalt base or consist of an asphalt mixture. Cork-asphalt and rubber-asphalt have been used successfully to surface playgrounds. In the search for better surfacing material, a balance must be obtained between resiliency and firmness.

35. These composition surfaces, like the older types, must be laid over a base. In many instances they are applied to re-surface existing surfaces.

Rubber Matting

36. This relatively new material, manufactured in interlocking inch-thick blocks, is designed for installation under and around playground apparatus. It is installed over a solid base.

37. While this material is not intended for general playground application, it does meet the general criteria when properly installed in specific locations. The material is also clean, resilient, durable, easily maintained and safe. Rubber padding under play equipment has now been in use for about two to five years in some places, and it appears that both minor injuries of the abrasion type, and major injuries such as concussions, appear to be virtually eliminated with the use of this material.

38. Although initial expense is relatively high, the matting requires practically no maintenance; hence, the actual cost is significantly lowered. In addition, the original life expectancy of the material, which was set at ten years, seems now to be a conservative estimate; under normal use the matting will last longer.

39. One study has shown a decrease in injury but a rise in the use of playground equipment where the rubber matting was installed. However, another has shown an increase in broken arms when dismounting from bars. The fear that the pads might be damaged by vandalism or removed has not yet been borne out in cities where this material is in use.

Synthetic Turf

40. This new material is being used in a variety of installations. From limited experience with installations in sports stadia and public playgrounds, there appear to be some safety advantages over natural turf. Although initial costs are high, the material has advantages such as lower maintenance costs, durability, consistency in surface, skid-resistance, and appearance. Resiliency is a factor of the under-surface, not necessarily of the material from which the synthetic turf is made. The material is produced in a variety of textures to suit specific purposes.

Caution

41. In designing playgrounds and playground surfacing, planners should avoid placing too much faith in the resiliency of surfacing materials as a factor in injury control. There is evidence to show that injury is more often a result of *how* a person lands rather than the surface he lands on. It should be noted, too, that all-weather surfacing material under playground equipment may result in more frequent use of that equipment. This in turn may produce an increase of minor injuries. However, serious head injuries are rare when cushioned surfaces are installed. A circus net would probably be ideal in keeping injury to a minimum. Since this is obviously impractical, supervision and training in the proper use of equipment—together with good design of equipment and facilities—are still the best defense against playground injuries.

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The information and recommendations contained in this publication have been compiled from sources believed to be reliable and to represent the best current opinion on the subject. No warranty, guarantee or representation is made by the National Safety Council as to the absolute correctness or sufficiency of any representation contained in this and other publications, and the National Safety Council assumes no responsibility in connection therewith; nor can it be assumed that all acceptable safety measures are contained in this (and other publications), or that other or additional measures may not be required under particular or exceptional conditions or circumstances.

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developed terrifyingly slippery surfaces that produced an army of grazed knees. Wooden planking tripped tumbly two year olds. Loose, egg-sized pebbles became hand grenades. The tan bark smelled deplorably and the sand was pure white and so finely granulated that it could not be built into sand castles. Whatever the surface used, its relation to play as well as its maintenance must be carefully considered.

At Expo we ended the season with a completely covered sand surface in the pre-school area and it worked remarkably well. However, grass is a pleasing and practical surface if the draining is good and the area big enough. Mounds can be covered in different ways to prevent them turning to mud. For instance, concrete sets, well pegged turf with irregular stepping stones or wooden log ladders to take the worst traffic are some of the solutions to the mud problem. All designers should remember, however, the play realities of mud, only adults don't like it.

Both ground cover and the provision of shade act to organize the outdoor play area. Peller (1972) notes:

As mentioned before, the playground should be directly connected with the main rooms. The ideal . . . yard offers not only space for running and apparatus for climbing, swinging, and sliding, but also several areas or, as we may call them, "rooms", with varying degrees of openness. The yard itself should either be partly hardsurfaced or girded by a paved walk for tricycles, roller skates, and other wheel toys. The hard sunface has the advantage of drying quickly after a rain. It has the disadvantage of harder falls. The ideal surfacing for children's play yards remains to be invented (though rubberized concrete and tanbark are good solutions under climbing equipment). Part of the yard should be shaded by trees. A pavement of bricks of hardwood or rubber is good, but the expense is prohibitive. Children spend long hours at the sandbox and it is desirable to have it shaded in the hottest part of the summer, yet every sand pile must at intervals be exposed to direct sunlight.

Play yards which offer nothing but asphalt are dismal and barren. Yet this solution to the problem of play yard surfacing is all too common. We would like to see some encouragement to centers to provide some variation in ground cover.

Outdoor areas for infant-toddlers really need a grassy area. Toddlers find that asphalt is hard and a very hot surface in bright sunshine.

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More thought needs to be given to standards for outside areas for very young children.

Fencing

Most standard-setting agencies stipulate that the outdoor areas must be fenced with a gate that can be closed and latched. American Academy of Pediatrics (1971) warns about *unsafe fences* (in which children could be caught or strangled). By far the most common fence is the chainlink - usually six to eight feet in height. National Safety Council cautions that *fences should be of sufficient height to discourage leaping or hurdling* (Safety Education Data Sheet - No. 29).

Concrete block fences sometimes are used in privately sponsored programs. The fact that children cannot see out often gives the yard a more private, less intrusive feeling. However, children are also separated from experiences which occur on the street. Especially in yards which provide little to do children often spend a great deal of time watching the world beyond the fence. Ideally, we think, a yard might provide both "see through" and "non-see through" areas.

Outside Storage Areas

Cohen (1974) cites the importance of outside storage:

> *Whenever possible, outdoor equipment should be stored outside to reduce the time required for carrying and setting up. For equipment that must be protected against weather, theft, and unsupervised use, garages or sheds with wide doors - and a childproof lock - can be built or purchased prefabricated. The children will be able to help return equipment themselves if they are given adequate supervision and are taught where things go.*

Provision for adequate outside storage usually means that there will be more interesting things for children to do. However, in some neighborhoods

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anything which is locked is viewed as an interesting challenge by older youths. Problems of vandalism make outside storage arrangments almost impossible in some areas. Some directors have reported to us that they cannot even leave tricycles out during the lunch hour. In such centers all moveable items are toted in and out every day. The provision of a large cart on wheels to move equipment in and out can provide some encouragement to staff not to give up important play opportunities for the children.

Plumbing and Electrical Outlets

There should be water taps (and, ideally, a sink) in convenient locations in order to provide for outdoor water play. An electrical outlet is also useful for certain art and craft activities, science and cooking projects.

Access Conditions

The details of functional yard arrangement will be discussed in another section. However, consideration needs to be given to convenient access to toileting facilities. Also, some thought should be given to truck access to replenish the sand in the sandpile and for other possible delivery chores.

Installation and Maintenance of Permanent Equipment

Child Welfare League (1973) makes the following suggestions about permanent equipment:

> *Equipment for the playground should be selected on the same basis as indoor equipment, in accordance with the ages, interests, and skills of the children who use it, but with special consideration of the opportunity it can provide*

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for vigorous activity and contact with the physical world. Installation of large stationary equipment should conform to local safety regulations. Such equipment should have a concrete foundation, extending at least 18 inches into the ground.
There should be a soft, resilient surface or a pad under all climbing or other stationary equipment, such as slides, teeter-totters, swings. Seats of swings should be of canvas, leather, or rubber.
All equipment should be kept in good repair and inspected regularly for signs of wear.
Showers, or a wading pool, kept in sanitary condition, add enjoyment to the outdoor program in warm weather.
Small slopes and tunnels, either natural or man-made, contribute to the interest of the playground.

Cohen (1974) adds:

In play areas, elevated platforms and equipment should have railings; permanent equipment should be sunk in concrete to a depth of 18 inches underground; swings should have plenty of room around them; boundaries should separate areas used for running and jumping from those used for quiet play; and balls should always be kicked or batted away from other groups or individuals.

Once the permanent equipment has been sunk into concrete the organization of the yard often has been irrevocably determined. It is important that this critical decision be made by the teaching staff, not by a central office administrator or the workman who will install it. Many outdoor areas in day care work badly because this decision was not made with sufficient care or wisdom.

Outdoor areas in family day care ordinarily are quite adequate in single family dwellings - the most common form of housing in areas with low population density. We do not know what recommendations would be appropriate for high density urban areas such as New York City. For family day care Cohen recommends:

Children in a family day care program need essentially the same outdoor space and play opportunities as children in a center. Outdoor areas should be fenced and should have a

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gate that can close and latch. The yard should be free of glass and cans, and garbage should be kept in closed containers away from play areas.

Most outdoor areas for children of school age are patterned after the public school playground. While provision of areas to play a variety of ball games is useful, we think that more thought should be given to the provision of a more varied space. Playgrounds which include more play equipment will be discussed in the next chapter.

Environmental Criteria (1971) provides a good summary of design considerations which we have found useful in organizing the basic features of an outdoor environment.

1. *The outdoor play area should not be so small that it is crowded nor so large that it cannot be properly managed. The size recommendations are 200 to 300 sq. ft./child. No more than two classes of 15 children each should use space at any one time.*
2. *Advantage should be taken of site characteristics such as variable ground levels, trees, earth mounds, areas of sun and shade, etc.*
3. *An adequate drainage system should be provided so that play areas dry rapidly.*
4. *A variety of play surfaces: soft grass, sand and dirt, and hard surfaces, are advisable.*
5. *The play area should provide an extensive range of features and materials that children may utilize to develop a more complete awareness of the world: objects with a variety of weights, colors, textures, shapes and sounds.*
6. *Specific areas for sand boxes, sand mounds, and water play are desirable. These areas should be separated from the traffic lanes of wheeled equipment.*
7. *Certain areas should be relatively unstructured so that children can use materials to develop their own environment.*
8. *Natural materials of a general form should be utilized when possible rather than detailed, artifical, and highly mechanical equipment.*
9. *Imaginative play equipment should be provided: wendy houses, large boxes, and other materials which can be used for construction.*
10. *A space for growing plants is desirable and should be in a protected sunny part of the play yard.*

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11. *Equipment for climbing, swinging and balancing should consist of simple materials, e.g., wood beams and old tires.*
12. *A fence should be provided around the entire outdoor area, and boundaries should be provided between the various functional spaces.*
13. *An outdoor shed should be provided for storage of portable equipment if not provided as a part of the main building.*
14. *A drinking fountain and convenient water faucets are recommended.*

15. *Special attention should be given to safety factors.*

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IV

PLAY EQUIPMENT

A full chapter could easily be devoted to the establishment of a rationale for play equipment. However, we will assume that there is no major argument over the desirability of keeping children interested and involved[1/]. There are differences of opinion about the major emphases which early childhood programs should have and to some extent these differences are reflected in disagreement about the usefulness of providing certain types of play experiences.

Bereiter and Engleman (1966) in viewing program goals with the narrow focus of compensating for defects, have stated that *an object-rich environment is ineffective*. However, they did not consider the broader goals of the day care program to meet socio-emotional needs of children.

Some people might consider it crass to argue that the provision of a rich environment for children greatly increases the comfort and emotional well-being of adults who are responsible for their care. Happy, involved children are much easier to live with than bored, frustrated children.

Regulations and Recommendations

Preschool

Consulting Services Corporation in their 1971 report show that 39 of 51 states have some requirement for educational equipment. Thirty-eight

1/ For anyone who wants a discussion of play, we suggest Fein and Clarke-Stewart (1973), Chapter 6, "Play Reconsidered".

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of 51 also require outdoor equipment. There are several ways to spell out requirements for equipment. The simplest is to set up requirements to guarantee safety, health and accessibility. For example:

> *Play equipment shall be safe, clean, and accessible to children.*
>
> New Hampshire

Another way is to specify specific kinds of equipment which shall be provided, for example:

> *Indoor educational equipment for preschool children shall include*
> *.Housekeeping and dramatic play equipment*
> *.Block building*
> *.Manipulative toys*
> *.Art materials*
> *.Musical equipment*
> *.Science or nature studies appropriate to the children's age and interest*
> *Outdoor equipment*
> *.Climbing structures such as platforms, A-frame, chicken coops, jungle gyms, rope ladders, steps, large sewer pipes set firmly in concrete, barrels*
> *.Wheel toys (appropriate to age) such as wagons, wheel barrows, tricycles, etc.)*
> *.Digging area, such as sandbox, sandpit, or natural ground*
> *.Balancing area, such as walking boards, logs, tractor tires, boxes, wooden or cardboard (for building or for climbing into)*
>
> North Carolina

Infant-Toddler

As yet, types of play equipment seldom are specified in regulations for infant-toddlers or children of school age. Another way of setting up requirements is to spell out the experiences the equipment provides. Willis and Ricciuti (1975) propose the following criteria for play equipment for infant-toddlers.

1. *Toys should encourage action.*
2. *Play materials should respond to the baby's action.*
3. *The responsiveness of toys and play materials should be natural rather than "gimmicky".*

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4. *A quality program includes toys that encourage social interaction and those that can be used by a baby alone.*
5. *Toys should be chosen and placed to give babies choices as they pursue their own interests, but with the aim of channeling their efforts to using emerging skills.*
6. *Play materials should be versatile - that is, they should lend themselves to a variety of uses.*
7. *Play materials should provide experience in a variety of modalities.*

These criteria strike us as useful in evaluating play equipment for children of any age.

Ferguson (1974) has proposed a broad range of both equipment and experiences which she thinks should be available to toddlers; she considers the environment as a major source of "equipment" of exploratory play.

1. *The environment offers opportunities to work with a variety of materials such as: sand, paint, play dough, pudding, paste, paper, crayons, chalk, mud, shaving cream.*
2. *There are role props available such as hats, dishes, brooms, sponges, water, bandaids.*
3. *There are opportunities for children to experiment with making sounds: bells, xylophones, drums, triangles, tambourines, rattles.*
4. *There are opportunities for language experiences: records, T.V. tapes, books, pictures, many objects.*
5. *There is an opportunity to experience different locomotor activities, such as: climbing, walking, balancing as evidenced in stairs, hills, holes, long flat areas, inclined ramps.*
6. *There are a variety of surfaces to crawl or walk on such as wood, bricks, linoleum, cement, stones, grass, carpeting.*
7. *There is an opportunity for a variety of sensory input and exploration.*
   a. *touching - a variety of experiences such as water, earth, natural growth, plastic, cloth, rough textures, people, animals, hard and soft surfaces.*
   b. *smelling - a variety of experiences such as flowers, grass, spices, food, paste, people, animals.*
   c. *tasting - a variety of experiences such as food, playdough, people.*
   d. *seeing - a variety of experiences such as shape, color, motion, pattern, size.*

Family Day Care

Amount or types of equipment ordinarily is left unspecified for family day care. Cohen (1974) suggests:

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In a small family program, the cost of equipment per child can be very high, and the caregiver needs to improvise to provide play opportunities at reasonable expense. Multi-use equipment should be emphasized - a climbing structure, a playhouse, a large sandbox. Children should also be encouraged to improvise and create. A big carton or crate makes a fine house or hideout. Walkways and rocks can be decorated with waterbase paints. Children can water and tend a small vegetable garden, and can later cook and eat vegetables they have grown themselves. For a change, snacks or meals can be eaten outdoors. A family day care program, though lacking the equipment and specialized facilities of a large center, is better able to use materials found around the home and can provide the children a better continuity of experience between day care and their own homes.

School Age

For children of school age Child Welfare League has proposed that the following experiences be provided:

.real tasks - cooking, repairing, sewing, carpentry
.physical education to develop skills in movement
.access to creative materials, science and nature materials, photography, music, dance, stories, poetry, and dramatic play
.occasions to explore and study the community and to take trips, particularly during the vacation periods, to museums, zoos, aquariums, factories, bakeries, etc.
.opportunities to take responsibility, consistent with their age, for planning their own activities and for participating on committees, preparing and serving foods, taking care of and putting away materials
.opportunities to acquire skills in arts and crafts, to learn how to play organized games, to engage in solitary activities

In order to provide these experiences, considerable amounts of equipment are implied (sewing machine, a range of tools, dark room, etc.) that are not part of an infant-preschool environment.

Review of Research

The evidence for the effects of play equipment is spotty and often difficult to evaluate because little attention is given to context variables

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such as availability of adult attention, amount of space and of other equipment, the exact perceptual configuration of equipment, etc.

Cognitive Gains

Some research has focused on possible cognitive gains from adding equipment to the classroom. Busse et al. (1972) studied the effects of placement of additional equipment in classrooms serving four-year-old black children. There were 6 experimental and 6 control classrooms to which 123 children were randomly assigned. Samples of materials added: a polaroid camera, prisms, shape-sorting box, Negro puppets, a tape recorder, etc. Teachers received no special training in the use of the new equipment. Pre- and post-tests on the WPPSI and the Binet and four subtests of the ITPA were administered. The control classes gained significantly more than the enriched classes in WPPSI performance score and visual reception. Enriched classes gained more in visual sequential memory. There is no information given as to what happened in these classes or how equipment was used. None of the teachers had training in early childhood.

Mann and Taylor (1973) compared the effect of providing a multisensory environment versus a traditional kindergarten on concept formation. A multisensory environment provided organic objects, artifacts, children's literature, movies, filmstrips, tapes, lighting, music, found objects, sculpture, toys, art media etc. around specific concepts. They found that with middle class five-year-olds this environment did not promote superior concept formation over a traditional kindergarten on concepts of color, shape, line and texture. Evidently adult feedback was more important than the environment.

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Evocative Power of Play Equipment

Social interaction. One of the major goals of a day care program is to promote social interaction. The following studies examine effects of children's involvement in various activity settings.

The effects of various types of play equipment on social interaction of preschool children has received some attention. Charlesworth and Hortup (1967) found that reinforcement by peers was dispensed in a higher proportion when a child was engaged in dramatic play activity than when he was engaged in art, music and table games.

> *The data on location of reinforcement show that opportunities for dramatic play activities are particularly conducive to the child's acquisition of positive social skills with peers.*
>
> p. 1001

Shure (1963) examined the behavior of nursery school children's behavior during free play in five activity areas: art, books, housekeeping corner, games and blocks. Observers recorded participation as relevant, irrelevant or absent/affect, constructiveness and social participation.

> *Relevant participation was highest in art and lowest in blocks; constructiveness was highest in art and books and lowest in blocks; single-child participation occurred most often in blocks and games; and complex social interaction occurred most often in the doll area.*

Mobility and conflict was greatest in the block area, constructive use of materials greatest in the book and art area. Green (1933) found more cooperation in doll play than in other areas. Updegraff and Herbst (1933) found that children imitated each other more frequently when using clay than when using blocks.

Houseman (1973) examined conflict among children in a variety of activity settings during fee play. She found that blocks had considerably more conflict than art activities. She concluded that such differences probably were related to five factors: *variety of play supported, space limitation,*

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clarity of demarcation, accessibility of preferred positions, and fixity of space and materials. Murphy (1937) observed that slides, tricycles with footholds and swings all promote cooperation in young children.

Activities can promote a variety of behaviors other than social interaction.

Talkativeness. Fein and Clarke-Stewart (1973) summarized research indicating that certain types of play equipment had differential effects on "talkativeness".

> *Outdoor and picture situations (Young, 1941), dolls, blocks, crayons, and clay (Van Alstyne, 1932) are apparently conducive to conversation; paints, scissors, and books are not (Van Alstyne, 1932), but, although the activity setting influences the amount of verbalization, it does not seem to help the child's syntactic or semantic development (Cazden, in press). Of course, this is true only as long as conversation is restricted to peer talk; the same claim could not be applied to activity settings that included equipment specifically designed to elicit and develop language skills - the Language Master, the talking typewriter, and so on.*
>
> p. 230

Glee. Sherman (1973) found that activities involving "intense props" such as rhythm band instruments and intense physical behavior such as dancing and exercising to records had the highest rate of gleeful behaviors. Individual construction activity had the least frequency of group glee.

Mobility. Shure (1963) noted that mobility was greater in the block area than in other areas. We found (Prescott, 1975) that play activities could be grouped into three categories (1) low mobility such as puzzles, table manipulative games, group story time, (2) indeterminate (i.e., some movement) such as dramatic play in the housekeeping corner, carpentry, blocks and (3) high mobility, large muscle play such as trike riding, swinging, etc. Some children seek out high mobility activities and are observed not to attend for long in any activity which requires extended sitting.

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Autonomy. Twardosz, Cataldo and Risley (1974) looked at the effects of providing infants with crib toys. They found

> *that the infants did spend a considerable part of their awake time in the cribs playing with the toys, and that the presence of the toys did not affect the length of time it took them to get to sleep or the length of time they slept. Crib toys can therefore be recommended in all situations but may be especially important in providing stimulation to infants who spend large portions of their day in cribs.*

They also looked at spoon use (1975) and found that it could be significantly increased by providing "mushy" foods which were popular with children.

We think that it is important to look at play equipment from the point of view of its evocative power. For example, we found that in many day care programs, teachers reported that children had never asked questions about birth, death, or procreation. These were also programs which did not have live animals (Prescott, 1965). The presence of animals and small children gives children a chance to be gentle and nurturing.

Swings, for example,

> *in addition to the special pleasures of swinging through the air and learning to pump, single swings offer something unique to children. We can think of no unit which so effectively and naturally insulates a child from the rest of the group.*
>
> (Kritchevsky and Prescott, 1969, p. 29)

Most of the play equipment which has been used traditionally in nursery schools is "good equipment" in the sense that it evokes behavior that appears useful from a developmental viewpoint and perhaps more important, that children find it appealing and attend with concentration.

Preferences for Equipment

Children's preferences for certain types of equipment also has received some attention. Vance and McCall (1934), in a study of children's

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preferences for play materials, found that 32 preschool children in both picture tests and actual use preferred water colors, work table, tools and clay. Blocks were least preferred by both boys and girls. Shure (1963) in a previously cited study found that boys engaged in the most social interaction in the block area, girls in the doll area. Boys spent more time with blocks, girls in the doll area. She commented that the equipment in the activity areas may have determined the differences in participation by boys and girls.

Hamad, Herbert-Jackson and Risley (1975), in a toddler day care center serving children 1-3 years of age, evaluated toys to determine which were intrinsically reinforcing. When the 92 toys in the center were examined in terms of the amount of time each was played with, a wide range of toy use was observed with the most preferred toy accounting for almost 7% of the total child play time while the least preferred toy was not used at all. A comparison of the 24 most preferred toys and the 24 least preferred toys in terms of overall level of play, showed that children played 57% of the time with preferred toys as opposed to only 25% of the time with the others; furthermore, disruptive behavior was lower with the preferred toys. They conclude that, although contingency management has been successful in increasing children's level of play, it is clear that toy selection is also effective in insuring high levels of engagement.

Pulaski (1970) found that, with children in the 5-7 age group, minimally structured toys such as paints, paper, clay, dress-up clothes produced a greater variety of fantasy themes than did more structured toys such as fully outfitted Barbie and Ken dolls, astronaut and army

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costumes, furnished doll houses, etc. Quilitch and Risley (1973), using a similar age group, examined the possibility that children's social behavior might be significantly influenced by the nature of the available play materials. Children in an urban recreation center were systematically provided with toys designed for social or isolate play. It was found that social play occurred only 16% of the time when the children were provided with "isolate" toys, whereas social play occurred 78% of the time when children were provided with "social' toys. They concluded that play materials differed in popularity with boys, girls, in their possibility for social interaction in initial attractiveness and long-term appeal. The selection of play materials should be an important consideration in any effort to teach children social behaviors.

Shure (1963), Vance and McCall (1934), Hamad et al. (1975), Quilitch and Risley (1973) all found marked differences in toy preference between boys and girls. Shure raises questions about ways in which presentation of play equipment may determine preference.

> *Some of the numerous questions that could be asked of further research imply causal factors in relation to situational factors. Would a rearrangement or addition of equipment change some of the frequencies of the behavior found in this study? For example, in the doll corner, boys' activities were irrelevant more often than girls' in this area. Perhaps more masculine play materials relevant to the area could be used such as men's hats, shoes, and pipes as suggested by Hartley, Frank, and Goldenson. This may also increase constructive use of materials. The influence of use of irrelevant materials in areas would be interesting. For example, does the location of one area in relation to another influence the frequency of any particular interdependence of areas? Would a placement of the doll corner near the block area influence more play by girls in constructive, if irrelevant activity in the block area? Or, would such a placement even influence more girls to actually play with blocks?*
>
> p. 990

In centers where staff do provide both men's and women's dress-up clothes, where all children are encouraged to try carpentry, where times are planned,

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if necessary, for girls to have access to blocks, sex differences in equipment use are less pronounced.

Clare Cooper Marcus (1974) cites studies which lead her to conclude that

> *Children prefer to play and move around in an environment that is varied and full of surprises (Cooper, 1974; Department of the Environment, 1972).*
>
> *Children need choice and variety to keep their interest since they rarely are engaged for long in one activity. While engaging in fantasy they need some secluded places, places to explore, and places to hide. They also like to have contact with the natural world - plants, earth, rocks, water, insects. The site-plan should reflect this by being irregular, with as great a variety of spaces, surfaces, levels, and plant materials as possible. A series of connected medium-sized spaces, of varying shape and appearance is preferable to one large or several identical spaces. If the site is relatively small, it is preferable to provide one or two moderate-sized spaces, rather than several very small spaces where groups of children can cause noise and over-use problems, and where maintenance can be costly and difficult (Shankland, Cox and Associates, 1968).*

Marcus (1974) also concludes that

> *Play equipment should be selected with children's preferences in mind.*
>
> *Children prefer equipment that moves (e.g., swings, roundabout) equipment on which they can move (e.g., jungle gym, climbing towers, etc.) and places nearby where they sit and watch the activity, talk, and play quiet games (benches and tables) (Cooper and Marcus, 1971; Hole, 1966).*

Cooper (1974) cites evidence that

> *Conventional play equipment is a much better investment than specially designed play sculpture.*
>
> *Children play much more frequently on conventional playground equipment (e.g., slide, swings) than on architect-designed play features, when given the choice of both (Holme and Massie, 1970). A significant relationship was found in one study between the use of play areas and the number of items of conventional equipment in them (Department of the Environment, 1973). When the views of children themselves have been surveyed, they too indicate that their preference is for conventional playground equipment (Department of the Environment, 1973; Hole, 1966).*

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In our studies we also concluded that much equipment that is designed to be visually appealing is, in fact, inferior to conventional equipment in its play possibilities.

Preferences for play equipment often seem to be determined by the specific experience which the equipment provides. We have found that play equipment can be classified according to its "coerciveness".

.Open equipment has no particular right way, does not require a specific product. Examples are clay, sand play, easel painting, trike riding.

.Relatively open equipment does require a correct way of use, but does not impose a specific product. Examples are tinker toys, lego blocks, crystal climbers.

.Closed equipment imposes strict rules or a specific product. Examples are puzzles, lotto, graduated cylinders, coloring books.

Open equipment tends to encourage creativity and experimentation and support social interaction. Closed equipment usually gives "right-wrong" feedback and tends not to support social social interaction. Some programs such as Montesorri tend to specialize in closed equipment. We think it is important for day care programs to provide both open and closed equipment.

In their enthusiasm for toys, as such, people often forget the appeal which variations in space can offer. Peller (reprinted 1972) notes:

> *The qualities of space--the feeling of spaciousness or of nestling in a small enclosure, the sensation of being high up and looking down--are a source of delight for the young child. Children love a wide open place where they can run with abandon; they like to huddle in a corner or under a table covered with a blanket, or to sit squeezed in a dolls' house. The more cramped and crowded the quarters, the greater the enjoyment can be. The adults' attitude toward space is usually quite utilitarian. They cannot derive from spatial perceptions, as does the young child, the joy and the whole gamut of sensations. If children were studying adults they would put into the textbooks that most adults are "color blind" in regard to space.*

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Children like to be high up and look down on objects and places which are familiar. Every nursery should have a kind of balcony, or as we like to call it, a "treehouse" in the play room. The young child enjoys climbing, and he should have ample opportunity for it inside the nursery as well as outdoors. The raised balcony also gives a chance to get away from the group and, last but not least, it adds a number of square feet of play space.

Good treehouses can be reached in various ways: by a ladder, a rope ladder, or notches cut into the wall. The child can leave his treehouse also by means of a slide. Each approach presents a different hurdle to the child. He may have to crawl into the treehouse through a narrow opening or to climb over a couple of rungs. Children are so taken with this "adventure in space" that they will take the trip many times in succession.

There are other spatial experiences the young child cherishes. The nursery school can offer many as the average home cannot. One school has on one side of the stairway a slide instead of a bannister. It seems superfluous to describe the delight of the youngsters, but we might mention the skill they acquire and point to the clever principle of making legitimate a pleasure which generations of children could obtain only by stealth. Of course, the stair must have a certain incline and the landing at the bottom should not interfere with other traffic in the house. Swinging up and down, gliding down a slide, climbing on the jungle gym and ladders or on a tree with low branches, constitute the more thrilling "adventures in space". The physical exertion, the sense of daring, add to the experience of space as a medium.

Scarcity of equipment. The appeal which materials have is important in evaluating how much there is to do in a given play space. Dawe (1934) observed 200 quarrels of 40 children aged 25-60 months and found that (1) the majority of quarrels were over possessions and (2) there were more quarrels inside when children were crowded. Clearly crowding affects the use and availability of toys. (See Rohe and Patterson, 1974, cited earlier.)

Variety. Throughout this discussion on play equipment we have stressed (1) the range of behaviors which equipment can evoke, (2) the fact that

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children have play preferences, and (3) that they need and invent novelty. All of these findings imply the wisdom of providing variety in equipment. Many times a play space will have enough to do, but provides little variety; for example, we have often seen outdoor spaces overpowered by climbing units and wheel toys or indoor areas dominated by table toys.

Amount to Do

Johnson (1935) varied the amount of play equipment provided to preschool children for outside play. She found that more equipment was associated with more bodily exercise, more play with materials, more social play and less crying, teasing, hitting and other negative behaviors. When there was less material, children more often improvised games of their own and, although social interaction was higher, there was also an increase in negative behaviors.

Fein and Clarke-Stewart cite Murphy, Murphy and Newcomb (1937) who

> *found that a large supply of simple materials, available to all children, focused attention on what could be created out of these materials. By contrast, a large supply of more complicated toys, with only one or two of a kind, was likely to stimulate competition and quarreling.*
>
> p. 230

Holding power. Quilitch a.' Risley (1973) and Rosenthal (1973) both note that some play equipment is initially attractive, but has little holding power. Rosenthal (1973) states that

> *Settings with low holding power, namely clothing, displays and vehicles shared several attributes theoretically conducive to rapid satiation, including a restricted range of constituent actions that were typically executed in perseverative, singular fashion without yielding clear indications that something tangible had been altered as a result of the child's participation.*

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Settings with higher holding power seemed to offer a greater variety of behavior modes which were typically organized or integrated together in a two-at-a-time fashion, such as the categorization and construction indigenous to puzzle assembly or the manipulating and matching characteristic of many novel ventures or the hand grasping and foot stepping simultaneous to most climbing pursuits. Art and role play were highest in holding power because they permitted considerable ingenuity and individuality.

Evidence that some settings and equipment have more holding power than others is important in understanding the amount of available things to do. Equipment with low holding power will result in a higher frequency of children looking for things to do.

Hayward (1974) found marked differences in the holding power of playgrounds:

In a study of children's use of traditional, contemporary and adventure playgrounds the authors found that children spent on the average of 21 minutes in the traditional playgrounds, 32 minutes in contemporary and 75 minutes in adventure playgrounds. They also found that children did not often make the decision to go to traditional playgrounds but usually made the decision to go to the adventure playground.

They suggest that

The ambiguity of the adventure playground offered the children a potential setting in which to define self as well as space. The playground was not entirely open, yet it offered a selection of loose parts (e.g., tires, wood, tools, paint, plants, seeds, and the like) which supplied part of the potential for children to define their own activities.

p. 166

Complexity. We found that play units could be classified according to their complexity, or absorption potential - the extent to which they contain potential for active manipulation and alteration by children (Kritchevsky and Prescott, 1969). We found that it was possible to discern three types of play units:

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Simple unit, a play unit that has one obvious use and does not have sub-parts or a juxtaposition of materials which enable a child to manipulate or improvise. Examples: swings, jungle gym, rocking horse, slide, tricycle.

Complex unit, a play unit with sub-parts or juxtaposition of two essentially different play materials which enable the child to manipulate or improvise. Examples: sand pile with digging equipment, a doll bed with dolls. Also included in this category are single play materials and objects which encourage substantial improvisation and/or have a considerable element of unpredictability, such as play dough or paints, a table with books to look at, an area with animals, e.g., guinea pigs or rabbits.

Super unit, a complex unit which has one or more additional play materials; i.e., three or more play materials juxtoposed. Examples: sand pile with digging equipment and water; a jungle gym with moveable climbing boards and a blanket, dough table with tools.

A particular space may contain a wide variety of units including many complex and super units, and thus appear to provide a good deal of choice to children. Still the question remains: Given the number of children expected to use the space, what is the liklihood that these play units will actually be available for children's choices? Based on the relative value of simple, complex and super units, we devised a method for approximating what might be called the number of play places that a room or yard actually has. To do this we assign a value of four to complex units, on the basis that complex units will generally accomodate about four children at once. Considering the unique potential of super units, we felt they were worth two complex units so we valued them at eight. Though many simple units can be used by more than one child at a time, the fact that they are less continuously interesting than complex units led us to assign a value of one to simple units. When the total number of play places of a yard or room is determined, this sum can be divided by the number of children expected to use the space. This ratio gives the approximate number of play places available to each child at any given time. For instance, in the example given under Variety on page 12, the yard would have a total of 30 play places.

Number of Play Units	Type of Unit	Number of Play Places
12 vehicles	simple	12
1 rocking boat	simple	1
1 tumble tub	simple	1
1 jungle gym with boxes and boards	complex	4
1 dirt area plus scoop trucks	complex	4
1 equipped sand table with water	super unit	8
	Total play places	30

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If the yard had 15 children, there would be 2.0 play places per child; if the yard had 25 children, there would be 1.2 play places per child.

Kritchevsky and Prescott, 1969
p. 13

We have found that when a play space has only 2 to 2.5 things to do, a free choice period will not work very well. Really good space has 4-5 things to do per child.

Larson and Greenfied (undated) essentially replicated our findings in a study of Vienna kindergartens. They examined children's behavior in three crowded kindergartens (averaging about 11 square feet per child!) and found that play unit complexity had a significant effect on the degree of social interaction, the degree of involvement, and the amount of pleasurable affect exhibited in children's play. They also found that the divided space in one kindergarten resulted in less disruptive contact and led to significantly longer sustained play.

Novelty. Our findings concerning the function of super units seem to explain some inconsistencies in the outcomes of other studies. In Johnson's study (1935), when play equipment was removed, children found things to do with sand, dirt and objects found on the playground. Paul Gump reports a study by Smith (reported in Gump 1975) when, during one condition only, apparatus was available. Under this condition children increased in cooperative play and unusual uses of equipment such as *sitting in a line of chairs as a pretend train, walking prams along tables put end to end.* If children are free to use anything at hand, they will often invent complex play units by making unexpected combinations of available materials.

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An important reason for providing natural objects in the outdoor environment such as grass (with bugs), trees with bark and leaves and the soil they grow in is that such natural objects greatly increase the complexity of the play area.

Gump (1975) notes:

> *A presumed "deprivation" of equipment does not necessarily lead to "deprived behavior". Under some conditions, children will compensate, even invent. One condition which may be favorable is novelty; children facing a new situation take new action. Another condition which can result in "deprivation" is the intrinsic quality of the resources which remain. When only apparatus remained in the Smith study, highly social and creative behavior resulted; however, when only toys were present and the apparatus gone, similar positive behavior was not developed.*
>
> p. 32

Nicholson (1970) describes the importance of the availability for children of things they can juxtapose. He calls it his "Theory of loose parts".

> *There is evidence that all children love to interact with variables, such as materials and shapes; smells and other physical phenomena, such as electricity, magnetism and gravity; media such as gases and fluids; sounds, music, and motion; chemical interactions, cooking and fire; and other people, and animals, plants, words, concepts and ideas. With all these things all children love to play, experiment, discover and invent and have fun.*
>
> *All these things have one things in common, which is variables or "loose parts". The theory of loose parts says, quite simply, the following:*
>
> > *In any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kind of variables in it.*
>
> *It does not require much imagination to realize that most environments that do not work (i.e., do not work in terms of human interaction and involvement in the sense described) such as schools, playgrounds, hospitals, day-care centers, international airports, art galleries and museums, do not do so because they do not meet the "loose parts" requirement; instead, they are clean, static and impossible to play around with.*

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Questions of Safety

The provision of an environment with loose parts means that children will experiment and try unusual ways of doing things. For example, if swings have seats which can be unhooked and the seat placed very high, very low or crooked, children will try out these possibilities with great interest. However, there are always adults who will say that swinging crooked is not safe. Safety is clearly an important issue in day care, but there is a difference between caring for safety by teaching children how to do interesting and challenging things safely and forbidding any kind of risk or innovation because it is unsafe. Typical of safety rules are those proposed by the National Safety Council (Bulletin 29):

> *Children should not be allowed to stand up or kneel on swings, or to jump from moving swings. Children should be discouraged from holding smaller children in their laps while swinging.*
>
> *Crawling or running up the slide, sliding down backwards and sliding in wet bathing suits should not be allowed.*

The problem with these rules is that these are things that children will do. If these things are strictly forbidden when an adult is watching, they will then be tried when no adult is around. If equipment is located on soft ground cover and children have facilitative supervision, they will more quickly learn how to take care of themselves. It is essential to build in safe design features, but, in our opinion, stifling to prohibit experimentation.

Heinicke *et al.* (1973), in our recommendations for mental health considerations in day care stated:

> *That restriction of activity because of possible safety hazards be carefully considered in terms of developmental goals.*

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Children who have opportunities to explore at their own speed, in environments peopled by helpful adults, learn to handle increasingly complex activities with safety and dexterity. In the interests of safety, many day care centers have chosen to eliminate swings, climbing apparatus, tools such as saws and hammers, and innovative play such as riding tricycles backwards. Such concerns for safety tend to reduce the complexity of the environment and limit opportunity for development of responsibility and physical competence. If the setting provides insufficient challenge, children often are goaded into limit-testing that actually can be dangerous.

Friedberg (1969) reaches similar conclusions.

A playground should have challenge. All too often the consideration of safety limits the degree of challenge to the child. A basic problem is to mitigate the danger and still provide a reasonable challenge to the child. Challenge prepares a child for maturity by developing a knowledge of his personal capabilities. He finds out how high he can go, how long he can balance, the extent of his endurance and the foolishness of overextending himself.

Challenge creates the basic interest for a child at play, and physical challenge is a major portion of this interest. The mastery of challenge is an accomplishment and can be developed by the creation of a series of preliminary steps that prepare one for the final goal. If the design does not allow for gradual orientation and the development of experience, then the progression is out of balance. Challenge becomes dangerous only when the child is forced to overextend himself.

Safety is, naturally, a major concern of the parent. A playground should be safe but not at the expense of experience, for play is a part of preparation for the reality of mature life with its built-in dangers. As the child grows, he must sometime learn to cross a street, climb a stair, fly a plane. But all these activities are done within rational limitations. The object in the playground is not to create dangers from which the child will require protection.

p. 9

As children grow into school age there is increasing need for day care to provide them with opportunities to test limits and experiment. Cooper in a discussion of adventure playgrounds states:

Another objection to the adventure playground is that it is potentially dangerous. It is partly this "potential danger" that attracts children to such a playground; in perceiving the possible hazards, they are, like all self-preservative species, extra cautious in their behavior. It is true that the site is often rough, structures built by the children may be hazardous, tools could be used in a dangerous way -- but all the available evidence indicates that the children are so absorbed in what they are doing, and so cautious in attempting anything beyond their present capacities, that the accident rate is in fact lower than that on conventional playgrounds with fixed equipment.

> *"...in all the ten years experience (with adventure playgrounds) in the United Kingdom there has been nothing more serious than cuts and bruises, and no parent has ever made a claim. Children are prone to danger whatever they are doing; many fatal accidents occur when they play in the streets amid the traffic, and very serious accidents occur when, because of boredom, they play monkey tricks on the fixed equipment on orthodox playgrounds. (Lady Allen of Hurtwood, 1968, p. 62).*

For the truth seems to be, when not offered challenges, children will seemingly use "safe" equipment is a potentially dangerous way to make their own challenges.

Cooper, 1970
p. 36-37

A recent study of children's games in Britain revealed that "a single group of children were able to name twenty games which involved running across the road." (Opie and Opie, 1969, p. 11) These included games such as "Last Across" where the winner was the child who came closest to being knocked down by an approaching automobile.

We should learn from this behavior, instead of merely trying to thwart it. Children, like all human beings, "tell the truth" with their actions. They play "Last Across" because courting danger is a necessary element of play. Those of us in the business of improving the physical environment should learn to interpret what they are telling us; we must learn to observe and really "see", to listen and really "hear". Perhaps then we would see that our objections to such solutions as adventure playgrounds are in some respect due to our own hang-ups, and especially to:

> *"...the wide cleavage between youth and age, childhood and maturity in our culture. Children like disorder*

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or find some invisible order therein. Most adults hate it. Children do not in the least mind being dirty. Most adults abhor it. Children will find enjoyment in the oddest and most unlikely play material; tin cans, milk bottle tops, broken slates, soil, cinders, firewood. The adult mind thinks of these things in terms of refuse or rubbish, and yearns for factory-made toys, areas of level tarmac, swings and roundabouts.

(John Barron Mays, Adventure in Play p. 5)

Cooper, 1970
p. 39-40

We include this newspaper story (Los Angeles Times, 6/6/75) as an illustration of the problems involved in trying to provide a richer play experience for children.

An Adventure Worth Having

For most city youngsters, sliding down a muddy hillside into a pond, building a shack, fishing from a homemade raft and swinging on ropes strung from trees are only things they have heard their parents and grandparents talk about.

Not so in Huntington Beach, however. It is all part of the reality of the city's 11-acre Adventure Playground.

Or was. The park now is closed because the city has been unable to work out an extension of liability-insurance coverage.

In an era of escalating court settlements for all sorts of injuries, damages and embarrassments, the problem is not surprising. Adventure Playground has produced its share of casualties. In 11½ months of operations, though, the most serious cases were one mild concussion, one broken collar-bone. Most of the injuries were the bruises and cuts that are inescapably part of growing up.

It is too good a thing to let collapse. Its usefulness was demonstrated by its popularity, drawing 10 times the attendance of conventional parks. It was an imaginative utilization of part of an abandoned quarry for the benefit, as it turned out, of an estimated 50,000 youngsters.

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Huntington Beach set an example for the region in meeting a need of its children. Now is the time for the region to sort out the actuarial problems to assure the continuation of this kind of constructive adventure.

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V

QUESTIONS OF ORGANIZATION AND PROGRAM

Throughout this presentation we have been discussing topics item by item as if each variable were separate and independent. This, of course, is not true - the parts are interrelated and must come together in a way that creates a program which is comfortable for both children and adults.

In this section, our discussion will focus primarily on centers since many of the problems which must be solved to provide individual freedom and the order necessary for group living occur when larger numbers of people are involved than are found in home settings.

Regulations and Recommendations

Family day care. Questions of organization in the home occur primarily around the sharing of space between day care children and the family living in the home (Sale, 1976). Cohen (1974) has summarized important considerations to be kept in mind when thinking about regulation of family day care:

> *In general, family day care operators are not reimbursed for the expenses of preparing a home for day care. They usually use what they have, rarely with more than a minor rearrangement of furniture.*
>
> *The realistic course for the family caregiver is to adapt and improvise, within the family's available means, to provide a setting conducive to the care of children for many hours a day.*
>
> *Part of the value of a family day care home is precisely the fact that it is a home, and a caregiver should not lose that advantage by trying to copy a center. A family day care home is not merely a small-scale, imitation day care center. It is a different kind of facility with its own characteristic advantages, which should be emphasized and used to the fullest extent.*

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Indoor Space

In planning a day care program for a private home, it is important to remember that the program must conform to the rooms and spaces available. The home must be comfortable both as the residence for the caregiver and her or his family and as the alternate residence for the children in day care. The major considerations are usually few, such as: designating the rooms to be used for day care and those to be off-limits to the children; deciding what restrictions, if any, to place on the children regarding the facilities; providing filing space for records; and perhaps buying such things as a chest for toys, a few new toys and pieces of equipment, some plastic dishes and glasses, and individual towels or paper towels.

Group care. When licensing regulations discuss requirements for overall organization it is usually done in a section labeled "program". There are four topics which can be found in these regulations: (1) a stipulation that there be a balance between active and quiet activities, (2) that there be indoor and outdoor play, (3) a provision for creative activities or some type of "free play" and (4) that children have opportunities for both individual and group play. For example (Licensing Abstracts, 1971):

A day care center shall provide a balanced program of opportunities for learning, indoor and outdoor play, rest periods and meals.

Oklahoma

The daily program shall provide constructive experiences for each child, through planned physical activity and creative play, allowing for both group activities and individual interests.

South Carolina

These statements imply that the adults have some way of regulating the flow of activity throughout the day. As we see it, there are three important ways in which caregivers can accomplish this: (1) through establishing some order and workable patterns of traffic, (2) through

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their ability to control access to materials and (3) through regulation of social patterns. Child Welfare League (1973) suggests that thoughtful placement of materials can avoid many problems.

> *Some principles for arranging areas of interests are the following:*
> *.Things that are used together should be placed close together.*
> *.Activities requiring close eye work should be assigned to the best lighted part of the room, free from glare.*
> *.Activities requiring protection from traffic, such as block building and housekeeping, should be located out of traffic lanes.*
> *.Quiet activities should be near each other and away from the more active ones.*
> *.Sufficient space should be provided in each area to insure freedom of movement for several children who may engage in the activity together.*
> *.Area should be arranged so that teacher guidance and supervision are constantly available.*
>
> *Orderly, clearly defined areas established within the playroom help children to develop a sense of order and encourage them to take responsibility for maintaining them.*
>
> *The arrangement of equipment, in good supply and easily available, should suggest activities and invite a child to explore. It should help each child to make choices, to see relationships, to organize his ideas, to think and to solve problems.*
>
> p. 82

They suggest that things that are used together be placed together. There is an important corollary to this, namely, that things which are placed together <u>will</u> be used together (unless sternly prohibited). Consequently, any teacher who does not want clay in the doll corner had better place the clay table at the other end of the room - or learn to appreciate creativity when it appears.

<u>Controlling Access to Stimuli</u>

Part of the problem in regulating the environment is to control the level of both auditory and usual stimuli. Environmental Criteria (1971)

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emphasizes the importance of separating noisy-quiet areas, especially for very young children.

> *Interior design should be such that noisy activities are grouped together. This recommendation has particular relevance for day care facilities giving services to infants and very young children as well as to the general arrangement of interest centers within the play area.*

Fein and Clarke-Stewart (1973) cite Shaffer (1968) who found *that perceptual monotony (noise or white hospital walls) has been found to decrease infant vocalization* (p. 166).

People responsible for infant-toddler programs at a recent meeting here in California expressed concern over their inability to regulate both auditory and visual stimuli for infants and toddlers in their day care settings. Arguments over the superiority of a closed or open plan for day care space often have revolved around the control of intrusion. Day (1974) observed for 80 hours in 14 centers. On the basis of these observations he advocates closed rather than open settings because (1) activity stays within the room with less noise distraction, (2) it is hard for children to find quiet private areas - naps, sick children, etc., (3) encourages small group activities.

Twardosz, Cataldo and Risley (1974) examined an open environment in an infant-toddler center with average daily attendance of 13 children. Their studies demonstrated that (1) an open environment markedly decreased the amount of time a child could not be seen by any adult and the amount of time staff members were not visible to the supervisor, and markedly reduced the effort required to supervise those who were not immediately visible; and (2) an open environment was found to be as conducive to pre-academic

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activities as a separate room. They concluded that an open environment was prefereable for infant-toddler care.

Twardosz et al. do not describe the square footage available for their 13 children but our guess is that it was well above the 35 square foot minimum. Furthermore, 13 children in an open setting is hardly comparable to larger numbers (from 30 to 100). An open setting can provide a confusing jumble of sound and visual distraction combined with too many different people in too much space unless careful thought is given to organization and to provision of privacy.

Montes and Risley (1975) examined the effect of providing free or controlled access to toys. They observed 14 black children, ages 4-5 and examined the effects of a free access condition to toys where children could select freely from a wide variety of toys in the housekeeping area versus a limited access condition where children were required to check out toys from the teacher and return them when they were not using them. They found no difference between conditions in the amount of time children spent playing with the equipment. Raters estimating complexity of sociodramatic play found the limited condition was the one in which the most make-believe action occurred. They concluded that since a limited access procedure initially reduces cleanup time and, rather than discouraging dramatic play may encourage it, such a procedure may be preferable to free access.

This procedure of having the child check out a toy from an adult is found in some homes (a child asks to play with something from the shelf, then brings it back to mother on completion), but we have rarely seen it in group day care probably because the adult does not want to take on this

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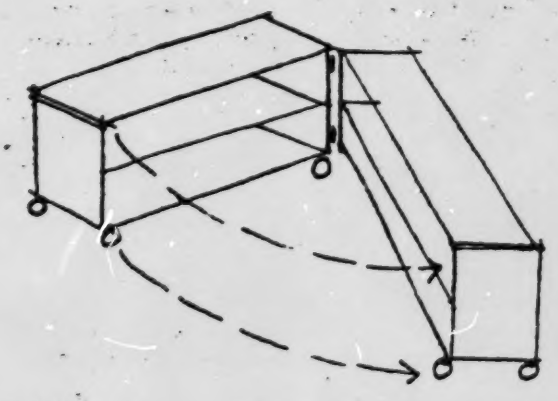
role with an entire group of children. Although such a plan may bring staff into useful contact with children, they usually choose to organize a room so children know where things are. However, this condition also places heavy responsibility on the caregiver to organize and maintain the play equipment.

Peller notes (reprinted, 1972):

> *Too many things are confusing. The child cannot find quickly what he wants so gives up and turns to the adult for help. He feels the burden of his own inadequacy. Only functional things have a place on the shelves in a room of active children. Toys or materials which have not been used for some time by any child should be removed. It may be advisable to remove them permanently, or to bring them back after a few weeks, placing them in a different spot.*
>
> *The order of the room should be simple and easy to remember. The child has a feeling of ease and competence when he knows where to look for a thing. Our direct guidance is a burden for him; our subtle indirect guidance gives wings to his conquering steps. Thus, we will take as much effort to display things attractively as a good storekeeper takes with his wares. The color of the open shelves should be neutral and unobtrusive in order not to distract attention from the bright colored toys.*

One of the best designs we have seen for controlling access is the storage cabinet sketched by Osmon (1971, p. 47). It is mounted on casters and, when opened, provides a protected area where children can play without intrusion. Such a design is especially useful where programs are housed in borrowed space which must be returned to its original state every weekend.



Semi-portable storage devices **can be left in place but can also be rearranged with a minimum of effort**

Flexibility. Another important aspect of organization and the control of access is a degree of flexibility

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in the setting. Permanent shelving, swings sunk into the requisite 18 inches of concrete, the location of the toileting areas are all fixed feature space (Hall, 1966). It is important to have some undeveloped areas (potential units) which can be created into play areas such as empty tables, a porch or corner floor area, etc. When things are on casters they are easily moved, and once moved the novelty of old or forgotten equipment is often restored.

Peller (reprinted, 1972) comments:

> *It should be possible to move almost everything outdoors--chairs, tables, shelves, screens, and easels. Often the children are glad to do most of the moving; after acquiring a certain amount of experience, the planning can be theirs, too.*

Pathways. We have found that clear pathways are very important to the total functioning of a play area (Kritchevsky and Prescott, 1969).

> *A path is the empty space on the floor or ground through which people move in getting from one place to another; it need be no different in composition from the rest of the surface. A clear path is broad, elongated and easily visible. Paths are very difficult to describe in words, but when they are well-defined they are easily seen. If an observer looking at a play area can't answer readily the question, "How do children get from one place to another?", probably the children can't either, and there is no clear path.*
>
> *Paths can be unclear for a variety of reasons, but the result is always the same: there is interference with children's seeing, moving to, and/or staying with a play unit. Sometimes a path is clear except for an overlapping boundary between adjoining play units so that children can reach across to one another. For instance, a climbing ladder next to a swing can be an invitation to a youngster to yank the chain on the swing and watch the ensuing activity--a screaming child and a rescuing teacher.*
>
> *Sometimes units are just far enough away to avoid interference, but it is still not possible to walk through the room or yard without entering space which rightfully belongs to a play unit. A child may set out across the yard to the sand box, but may wind up climbing because he arrived inside the surrounding use space of the jungle gym first.*

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Occasionally, a path is clear but does not easily lead to certain units. To come unexpectedly upon something intriguing around a corner, or to see a familiar play unit from a new angle can stimulate play, but units are sometimes permanently hidden.

A total absence of path, because of too much equipment placed too close together, is very disruptive. The adult cannot see a path and neither can the children. There is always some empty space in which children move around, but in this kind of room or yard children will bump into one another and will interfere, accidentally and often, in one another's play.

p. 15-16

Clear pathways are important to the safety of outdoor areas 1/ and to the prevention of undesirable intrusion and unnecessary chaos in indoor areas.

Privacy

In homes, one of the important ways in which the adult regulates children's experience is through the judicious use of private or protected boundaried areas. Children also intuitively self-select such areas. The fact that a child at home can crawl into a big easy chair, settle under the dining room table, or take a soothing bath in a smooth, boundaried tub before nap time, contributes to the well being of everyone involved. These are ways in which children can have privacy to pursue their own ideas and regulate their own needs for active and quiet time. In family day care many opportunities for privacy still exist. In group care, private corners are often strikingly absent and their creation takes thought and ingenuity.

Tars and Appleby (1973) compared the behavior of a ten-year-old at home and in a psychiatric setting. A large number of measures indicated that he showed more initiative, more investigative behavior and less

1/ Poor pathways often create unseen hazards which can result in accidents.

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hostility in the home setting than in the hospital setting. Among their conclusions they comment:

> *The results discussed in this paper raise a number of questions about the influence of certain aspects of the institutional environment on the developing child. The suggestion that a highly programmed environment rich in environmental props may represent a form of homogeneity that can curtail the expression of creativity and initiative, and affect cognitive and motivational development, certainly deserves further research. Second, the effects of prolonged lack of privacy, without opportunity for "refueling", on the expression of social behavior should be more fully explored.*
>
> p. 25

Wolfe and Laufer (1974) conducted an interview study with children aged 5 to 17 on their conceptions of privacy. Although 53% of the 5-year-olds couldn't give a definition of the concept "privacy", almost all of them could define it in the context of an activity. For most of these youngest children, privacy meant "quiet" and/or quiet as a condition for engaging in an activity.

Naturally, the complexity of the children's definitions of privacy were related to their ages, but Wolfe and Laufer were able to identify four major types of privacy that were most important to children:

1. controlling access to information (e.g., secrets, not having others know something you know, etc.)
2. alone (to be by onself)
3. no one bothering me (freedom from distraction)
4. controlling access to spaces (having a place of one's own to which one could limit the access of others).

Not only were these four types of privacy identified, but it also appears that they are independent of one another. These preferred forms of

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privacy actually identify four independent groups of children, within and across age groups.

Furthermore, the four not only mesh with some of Spivack's (1973) archetypal places, e.g., shelter and territory, but they add extra dimensions to the list of design requirements for children's needs. These are aspects of personal design generally not attended to in institutional settings, but perhaps of particular importance to day care.

Probably a major difference between the space provided for a half-day nursery school or public school and that provided in day care is (or should be) the provision of privacy, in the forms identified by Wolfe and Laufer (1974). Peller comments (reprinted, 1972):

> *The children whose nursery day is longer than three or four hours need several rooms. For the child who comes for a half-day only, the company of others is the main need; but if he comes for a longer period, privacy is as important as company. Both are needed for social and emotional balance by children no less than by adults. It seems hardly necessary to say that the seclusion must be self-sought in order to give the child relaxation and serenity. The main room may have alcoves or nooks which can be partitioned off with a sliding door disappearing into the wall when not in use, or with a door of transparent plastic. Transparent doors do not cut off the child from the group yet give him quiet if he wants to look at picture books, to rest, or to play with only one or two children. Or an alcove can be used the other way around--to protect the majority from the noise of a minority. With the carpenter bench in there, the lusty hammering and sawing need not disturb the other children. There is a notion that young children are mob minded and that when given a chance, they will always flock together into a big noisy crowd. Observation of children, for whom the company of other children is nothing new, disproves this; they often like to play in very small groups.*
>
> p. 224-225

We have used a measure of intrusion-seclusion potential as one of the components of our rating of good space in preschool and school age

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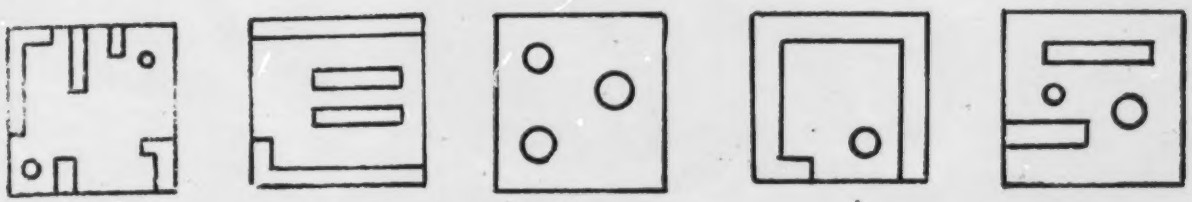
day care (Prescott, Kritchevsky and Jones, 1972; Prescott and Milich, 1975). Intrusion-seclusion potential was calculated by counting:

(1) Insulated units, areas which provide "protection" for three or four children. Examples: a block building area set off by low shelves; a housekeeping corner blocked off from the rest of the room by sink and stove.

(2) Hide areas, cozy private space which usually have room for one or two children. Examples: barrels, small crates, a play house.

We identified five common ways of arranging rooms. Of the five, the insulated area arrangement provides privacy, the mixed area some privacy.



1. Insulated area
2. Straight line
3. Circumscribed activity area
4. Open area
5. Mixed

Thoughtful attention to room arrangement helps to prevent unwanted intrusion. Other things like elevated platforms, lofts, boxes to climb into also add to seclusion. Peller (reprinted, 1972) describes the use of moveable partitions for this purpose:

> *Low screens and protruding shelves, variations on the theme "wall", help to subdivide the room and give a certain degree of privacy to groups of playing children. If many children eat in one room, screens may serve as partitions to form a number of booths. They can also be placed to help direct the traffic of children who carry plates and food back and forth. Encouraging children to help in this way allows them a legitimate opportunity to break the strain of sitting at the table*

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throughout the entire meal. At rest time the setting up of enclosures giving privacy is even more essential than at meal times. At play time the children will soon discover that screens can create various enclosures or may even become part of their play equipment on occasion.

Softness. There is another dimension which we have found to be predictive of much that happens in a day care program and that is the dimension of "softness". The softness rating was so named because it appeared to indicate the responsiveness of the environment to the child especially on a sensual-tactile level. It was based on the presence or absence of eleven components:

(1) malleable materials such as play dough;

(2) sand which children can be in, either a box or area;

(3) "laps", teachers holding children;

(4) single sling swings;

(5) grass which children can be on;

(6) large rug or full carpeting indoors;

(7) water as an activity;

(8) very messy materials such as finger paint, clay, mud;

(9) child/adult cozy furniture: rockers, couches, lawn swings, etc.;

(10) dirt to dig in;

(11) animals which can be held such as guinea pigs, dogs, cats, etc.

The presence of softness tends to be associated with opportunities for privacy. The softness indicators appear to be an expression of adult willingness to let the environment be children's wishes and needs. Programs which are designed to give few choices to children seldom have high softness ratings.

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Outcomes of Good Space

In our 1967 study (Prescott, Jones and Kritchevsky), we found that there was a significant relationship between yard quality (as measured by amount to do, variety, and organization) and the behavior of children and teachers.

YARD QUALITY BY TEACHER MANNER AND CHILDREN'S RESPONSES

YARD QUALITY CATEGORY (N=451 observations)	TEACHER MANNER* Ratings of Sensitive and friendly	CHILDREN RESPONSES* Ratings of Interested and involved
1. Excellent (N=82)	89.0%	85.0%
2. Very good (N=51)	87.0	67.0
3. Good (N=92)	55.0	49.0
4. Average (N=93)	56.0	62.0
5. Poor (N=34)	53.0	62.0
6. Very poor (N=29)	38.0	51.0
7. Bad (N=70)	46.0	43.0

Significant * .05 level (F ratio)

p. 310

The lessons taught described in the following table describe the major emphasis of teacher input during each 20-minute observation 1/

1/ An interesting fact is that when a yard is totally inadequate (see category 7, "Bad", in both tables), teachers appeared to take a more active, constructive role in trying to make things work for children.

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YARD QUALITY BY SELECTED LESSONS TAUGHT

OBSERVATIONS BY YARD QUALITY CATEGORY (N=451)	LESSONS TAUGHT (As a percentage of total lessons taught)				
	Mean # lessons taught per obs.	Consid-era-tion*	Creativ-ity & experi-menta-tion	Rules of social living*	Control and restraint
1. Excellent (N=82)	2.8	26.0%	21.0%	0.0%	2.0%
2. Very good (N=51)	1.7	15.0	14.0	4.0	12.0
3. Good (N=92)	1.6	6.0	19.0	8.0	15.0
4. Average (N=93)	1.5	11.0	18.0	15.0	6.0
5. Poor (N=34)	1.6	18.0	4.0	22.0	2.0
6. Very poor (N=29)	0.8	4.0	9.0	23.0	18.0
7. Bad (N=70)	2.1	4.0	2.0	18.0	15.0

Significant * .05 level (F-ratio)

Day (1974) observed for 80 hours in 14 centers. He concluded that quality, as indicated by cooperative behavior, autonomy, constructive use of materials, little aggression and involved teachers was dependent on (1) the physical arrangement and utilization of space, (2) the availability and diversity of materials and (3) amount and kind of teacher interaction.

In a study of day care for school age children (1974), we observed 1642 activity settings in 29 centers during the school year and in the

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summer. A factor analysis indicated that the strongest factor differentiated between a simple and complex program and that good space was part of that factor.

The factor describes the differences between programs which provide a play area (usually used by preschool children during most of the day) and very little else, as compared to a program which undertakes to provide an enriched program geared specifically to school age children. Of all the factors this was the strongest, and it most clearly differentiated between programs whose main goal was to provide a safe play space with supervision from those programs with the broader goal of providing for a wide range of needs and interests.

Factor I: Simple vs. Complex Activity Program

	Loadings
Little adult initiative	*.55*
Activity age level (2-4)	*.50*
Little adult know-how	*.39*
Little continuity	*.36*
Out of activity	*.32*
Arts and crafts	*-.31*
Activity age level (9-13)	*-.42*
Much continuity	*-.43*
Work	*-.47*
Elaborate equipment, supplies	*-.49*
Much child initiative	*-.50*
Small group (3-5 children)	*-.52*
*Good space **	*-.54*
Much adult initiative	*-.59*
Much adult know-how	*-.65*
Activity age level (6-8)	*-.65*
Some adult initiative	*-.66*
Some unusual equipment, supplies	*-.66*
Some continuity	*-.75*
Adults involved in activity	*-.76*
Some adult know-how	*-.79*

**Good space was a variable created to describe centers where both indoors and outdoors were simultaneously available, where at least eight of the softness indiactors were present, where storage areas were accessible, where organization was basically clear and where room arrangement contained at least one insulated area.*

Prescott, 1974
p. 30

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In school age day care we proposed that centers which offer complex activity settings, as described, have programs of high quality. The presence of these indicators of quality was associated with the presence of three program supports: (1) adults with know-how, (2) good space, and (3) unusual equipment and supplies.

Adults may have close involvement with children, but unless they have know-how they cannot easily provide opportunities for children to observe and learn new skills, nor do they make good models for children of this age.

Good space provides for indoor-outdoor accessibility, so that choices are available and children can decide whether to be inside or outside. Good space includes softness for comfort, insulated areas to protect from intrusion, and storage, so that there are places to keep unusual equipment and plenty of supplies. Furthermore, good program, even when it involves the most skilled adults, does not occur in a vacuum. It is grounded and held together by <u>good space</u> where activities can occur, and by <u>objects</u> -- the supplies and equipment which are essential to the activity. These objects need a place, called <u>storage</u>. Tasks with a purpose grow out of these kinds of spaces, and learning to order and control the space to keep the tasks going becomes another dimension of complexity, that of maintaining, in cooperation with others, a workable living space.

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VI

CONTEXTUAL CONSTRAINTS

In the preceding sections we have discussed the relationship between features of the physical environment and the behavior of its inhabitants. However, it is misleading to suggest a simple direct relationship between physical objects and behavior. As Barker (1968) and Gump (1975) have pointed out there are organizing features in an environment which have to do with the purposes of settings and with agreed upon ways for carrying out these purposes. In center day care we identified five activity formats which are commonly used to carry out the purposes of this setting. These activity formats are:

.Teacher-directed group activity: The teacher leads an activity in which the children engage as a group, such as story time, music or rhythm games. Children are expected or required to participate.[1/]

.Teacher-directed individual activity: The teacher has planned an activity in which all children are again expected to participate, but which is carried out individually by each child such as pasting, puzzles or drawing.

.Free play: Children are free to choose among all activities available in the room or yard such as swings, sand pile, climbing equipment, etc. The teacher has not made prior preparations, but uses the play area as it exists.

.Free choice: Children are free to choose among all activities available; however, the teacher has made prior preparation and has set up one or more

1/ A variation of this option is a teacher-selected option where children work individually, but are given play materials or must request materials from the adult. This option was rarely observed.

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activities especially for this play period, such as use of a clay table or water play.

.Official transitions: These periods provide a spacer between activities required by the adult as essential to the mechanics of group living, such as moving the group from indoors to outdoors, toileting, preparing for lunch, etc.

The choice of a particular format tends to elicit predictable interactions between children and adults (Prescott, 1967). We found the following relationship to exist.

Teacher Behavior	Type of Activity Setting			
	Teacher-Directed Group	Teacher Directed Individual	Free Play	Free Choice
Guidance (Teacher tells child what to do)	high	high	low	low
Restriction (Teacher tells child what not to do	low	high		very low
Instruction	very high	high	very low	
Neutral (No particular purpose to interaction)	very low			
Encouragement (Teacher responds to cues from child)	low	moderately high		high

We think it is important to recognize the distinction between free play and free choice activities. Fein and Clarke-Stewart (1973) summarized this dintinction as follows:

> *Prescott et al. (1967) examined the impact of program format and in so doing made an important distcintion between "free-choice" and "free-paly" formats. In a free-choice format children choose among activities prepared by the teacher for*

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special purposes; in a free-play format all activities are always available and there is little teacher preparation or selection. The free-choice format was notably high on teacher encouragement and low in restriction: teacher leadership was active and directed to individual children and the tempo of play was relaxed. In the free-play format teacher encouragement was relatively low and restriction high and the tempo was relatively tense. This format was also high on noncommunicative teacher activity and care of physical needs.

p. 109

Not only do teachers behave differently, but we have also found that in a free choice format complexity and novelty of play materials (and often the total amount of things to do) is considerably higher than that found for free play formats.

Doke (1975) examined the effect of formal and informal activities on eleven children age 4 to 5. The formal condition required that the children remain in a group and focus attention on the teacher with little or no manipulative material available. In the informal condition children were free to obtain materials and use them in a variety of ways. We see the formal condition as a teacher-directed format and the informal as either free play or free choice. Doke found that the amount of time spent in participating during the informal activities was consistently higher than in the formal. In addition, misconduct was more likely to occur during the formal activities. He also notes that during the formal (teacher-directed) condition there were few materials available. We have found that this relationship between format and available materials is typical.

Program Format

Center programs appear to jell around the selection of certain activity formats. We found that in centers where staff feel that it is important

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for children to be engaged in activities of their own choosing free choice will be the most frequently used format. In centers where adults feel that they should make most of the decisions about how children spend their time, teacher-directed activity formats are frequently used, usually alternating with free play. Free choice is seldom used. We have called these alternate types of program structure "open" and "closed". The decision about the use of particular types of activity formats turns out to be a powerful predictor of the use of the physical environment, the behavior of teachers and the experiences which are made available to children. Centers which use an open program format look very different along a variety of dimensions from centers which use a closed program format.

Berk (1971) describes some of these differences in a discussion of constraints found in two nursery school settings:

> *The most dramatic finding -- the exceedingly high incidence of desire versus teacher expectation in the Montessori School as compared with the University Laboratory School -- is attributed to the great necessity for order and routine to be established by the teacher of the structured school for the tasks of her school day to take place smoothly and efficiently. In the University Nursery School, there was little emphasis on the routine aspects of nursery school life, and the rituals of washing and toileting, of putting away toys, and of partaking of midmorning juice were flexible and adaptable. In many such situations, only a minimum of conformity was expected. In contrast, the Montessori method fostered a prepared environment with highly structured materials and equally ritualized expectations for their use. Whereas in the University Nursery School, materials could be manipulated in any way the child desired, in the Montessori School it was necessary for the teacher to intervene in the child's activity to demonstrate proper use of materials and to interrupt him when she saw that the equipment was not being used correctly.*
>
> *The majority of the time, the Montessori children were engaged in group activities conducted by the teacher or in sedentary, solitary tasks which demanded concentration for mastering the*

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strict rules pertaining to use of materials. Social interchange among the children, although it did occur, was not encouraged, as it was in the University Nursery School, and no provisions were made for dramatic and fantasy play. This differential emphasis in the two schools on social interaction and physical activity may well be responsible for the greater proportion of desire versus desire, desire versus clutter crowds, and verbal adaptive strategies which occurred in the University Nursery School

p. 865

We looked at children in centers using open and closed structure and compared the experience of children in these two types of center structure to that of children who were in home settings (Prescott, 1973).

One hundred twelve children, age 2 to 5, were observed, each for 180-200 minutes. Eighty-four of these children were selected from 14 day care centers with a community reputation for quality, one half having open and one half having closed structure programs as determined by the administrator's policies on teacher versus child initiation of activities. Fourteen children were selected from 14 family day care homes where the criterion for quality was commitment to participation in a demonstration community family day care project. The nursery school-home combination consisted of 14 children from intact families who attended a half-day community nursery school and spent the remainder of the day at home with mother. Mean age of the children was 45 months. There were no significant differences by age or sex across types of care. The three types of day care included children from families varying in socio-economic status and ethnicity.

An observational instrument, The Day Care Environmental Inventory, was designed to permit immediate coding of two levels of behavior. One code was designed to record the child's mode of behavior in categories of rejecting, thrusting, responding and integrating, his or her direction of attention and amount of adult input every 15 seconds. The other code provides descriptors for a unit called the activity segment which accounts for the larger activity system of which the 15-second coding is a part.

The following tables show the wide range of differences among these settings.

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BEHAVIORAL VARIABLES SHOWING SIGNIFICANT DIFFERENCES
BY TYPE OF CARE

BEHAVIORAL VARIABLES	TYPE OF CARE			
	Closed Centers (N=42)	Open Centers (N=42)	Family Day Care (N=14)	Nursery School-Home (N=14)
15-Second Coding				
* Total rejecting	3.5%	3.6%	2.3%	2.4%
* Actively rejects	1.9	2.6	1.6	1.6
** Ignores intrusion	1.6	1.0	0.7	0.8
** Total thrusting	25.7	34.2	37.0	37.7
* Total responding (except looks, watches)	23.0	19.3	18.9	17.5
** Meets expectations	15.6	10.9	7.2	8.0
** Receives help	4.5	5.4	9.5	7.6
** Receives frustration, rejection	2.5	2.1	1.0	1.2
* Tactile, sensory	1.9	2.3	4.0	2.1
NS Total integrating	21.0	19.9	22.1	21.5
** Shows awareness of cognitive constraints	2.8	2.1	3.1	4.3
* Not attending to external stimuli	2.0	1.3	0.3	0.7
** Tentative behavior	7.3	5.5	2.6	3.9
* Direction of attention to adult	25.2	21.7	26.4	29.0
** Direction of attention to child	19.9	21.9	16.3	13.7
NS Direction of attention to environment	46.5	48.8	48.3	48.9
** Direction of attention to group	3.5	3.8	1.2	4.4
** Dual focus	4.9	3.8	7.9	4.0
	Frequency of Adult Input to Individual Child (per 100 minutes)			
** Total adult input	33.4	22.2	40.3	40.1
** Adult instigation	11.1	13.0	28.9	35.4
** Adult pressure	22.3	9.2	11.5	4.7

* Significant at .05 level; **, .01 level; NS, not significant (F-ratio)

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ACTIVITY SEGMENT DESCRIPTORS BY TYPE OF CARE

DESCRIPTORS	TYPE OF CARE			
	Closed Centers (N=42)	Open Center (N=42)	Family Day Care (N=14)	Nursery School-Home (N=14)
Source of Initiation				
*** Adult pressured	58.1%	20.0%	11.1%	7.7%
** Adult facilitated	9.6	23.0	20.2	27.0
** Another child	1.2	4.4	7.6	4.6
*** Spontaneous	26.3	45.9	55.1	52.5
Source of Termination				
*** Adult pressured	57.1	20.5	14.2	6.1
* Adult facilitated	10.5	20.1	13.6	19.9
* Another child	1.7	3.6	8.1	5.1
*** Spontaneous	21.5	42.6	48.5	56.1
Program Structure				
*** Free choice	29.2	62.2	73.7	75.5
NS Teacher directed individual	3.9	2.0	3.4	2.6
*** Teacher selected individual	6.5	0.7	2.7	0.7
*** Teacher directed group	24.0	10.6	3.4	8.6
*** Structured transition	24.0	9.9	2.0	2.6
Activity Segment Label				
*** Imitating	8.0	2.4	1.0	1.0
** Unusual creative exploring	1.6	4.4	6.1	9.2
** Standard cognitive	9.6	3.5	2.5	4.1
*** Unusual cognitive	1.6	2.1	3.5	9.2
Teacher Approach				
*** Sensitive	9.0	20.5	29.8	34.7
NS Friendly	27.5	31.5	30.8	28.1
*** Neutral	27.3	16.5	2.0	8.7
*** Insensitive	17.2	4.4	1.5	1.0
Teacher Emphasis				
*** Social rules, control, restraint	34.5	16.6	8.1	5.1
* Consideration, mutuality	4.0	9.7	12.1	10.7
*** Imparting information	5.2	5.7	6.6	17.8
** Pleasure and delight and dealing with emotion	3.2	11.3	12.1	10.7
* Creativity and experimentation	0.4	3.8	0.5	5.1

(cont.)

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ACTIVITY SEGMENT DESCRIPTORS BY TYPE OF CARE (cont.)

DESCRIPTORS	TYPE OF CARE			
	Closed Centers (N=42)	Open Centers (N=42)	Family Day Care (N=14)	Nursery School-Home (N=14)
Social Structure				
** Child alone	5.0%	6.1%	13.1%	13.8%
NS One friend present	7.5	12.8	8.1	10.7
*** Adult involved individually with small group	1.5	3.9	5.5	17.8
Complexity of Play Materials				
** Simple	57.6	44.9	42.3	26.2
*** Three materials juxtaposed	5.2	10.9	12.8	26.7
Mobility				
* Limited	51.7	36.1	14.7	42.9
Affect				
*** Neutral	34.7	26.8	21.7	15.8
Child Involvement				
*** Low	13.9	8.2	3.6	5.6
Adult Influence				
*** Closes possibilities	31.5	14.4	13.1	9.7

* Significant at .05 level; **, .01 level; *** .001 level; NS, not significant (F-ratio)

Closed structure group day care appears to provide clear limits and adult input to which children must attend, but it appears to be somewhat lacking in opportunities for autonomy and initiative and in positive adult-child interaction, or in supports for self-esteem. Sensory stimulation also is notably lacking. Adults rarely hold or hug children, and messy materials such as finger paint, clay and other tactile sensual materials characteristically are absent. Environmental responsiveness in the form of rugs, pillows, swings, animals, and cuddly toys usually is lacking. Restrictions on mobility and requirements to maintain specific body positions are high.

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Open structure group care offers opportunities for rewarding child-child interaction and provides more opportunities for autonomy and initiative. However, adult input appears to be markedly diluted as compared to other types of care. Opportunities for cognitive engagement also were relatively low.

Family day care and nursery school-home care present markedly similar profiles. Adults in both home-based settings were more available to children than in group care; opportunities for the child to make choices and to control the environment were markedly higher than in group care. Supports for self-esteem appeared high. Opportunities for cognitive engagement did not appear to be lower in family day care than in open structure group care, although adult input toward this goal may be somewhat less. Nursery school-home care appeared to provide for maximum individualization and for somewhat more cognitive input than family day care.

Roger Barker has observed that behavior settings (in the present discussion, family homes and day care centers) appear to possess inherent regulatory features that stem from the purposes for which the settings exist, their physical attributes, and the number and kinds of persons present in them. These aspects of a setting determine to a great extent the activities and types of behavior that will probably occur within its boundaries (Barker, 1968).

The findings reported here were associated with marked differences in the physical setting and in the adult-child ratio during activity segments.1/ One to one and 1:2, 3 ratios occurred with about 5 times the frequency in home-based as compared to center care. It appears that some day care settings are not optimal for certain kinds of activities and behavior and that such actions are not likely to occur unless the adults involved are highly motivated to bring them about and are exceptionally skilled in doing so. The question about possible long term effects of the differences reported here on children remains unanswered.

Prescott, 1973

1/ As indicated in the table, the complexity of play materials differed; the softness rating described earlier was very low in closed structure centers. Home settings had adult sized furniture and equipment found in homes These things often were used to create novelty and complexity.

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The findings about differences in the adult-child ratio raise questions about the optimum size of the social unit. In family day care, the number of people in the unit is seldom larger than six. Centers are designed to accomodate much larger groups. Moreover, the centers in our study which used open structure tended to be smaller than those that used closed structure. Neither the size of the administrative unit nor the size of the group within the administrative unit has received much attention but both may well be variables which determine important features of the caregiving experience.

Size of Facility

In our 1967 study (Prescott and Jones) we found that size of center stood out as a dependable predictor of program quality. In those centers which served over 60 children, as compared to those enrolling 30-60 children, there was significantly more emphasis on rules and routine guidance. Teacher emphasis on control and restraint was 2½ times higher, and global rating of teacher manner was often rated neutral or distant and almost never was rated as sensitive. Conversely, in smaller centers emphasis in these areas was low but provision of opportunities for pleasure, wonder, and delight was significantly higher.

In addition, we found that large centers almost never offered children the experience of participating in wide age range groups. (Our data indicated that settings inhabited by children of mixed ages work very well in full day care, offering many more opportuniities for children to serve each other as models and facilitators as well as greatly enriching the possibilities for play.) Large centers were also found to have play areas which rated low on organization, variety, and amount-to-do per child.

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These differences in grouping and in richness of play possibilities available within the physical space were associated with a program format which offered fewer opportunities for children to initiate and to choose than the program format most commonly utilized in centers of moderate size.

In large centers children were seldom observed to be highly interested and enthusiastically involved. These findings on the relationship of size to amount of personal involvement are not unique to our study, but have been corroborated in other kinds of settings such as schools and factory work groups.1/ Large centers did have better trained teachers and an absence of crowding. Although both of these factors typically were predictors of sensitive teacher interaction, this relationship was reversed for large centers.

The Abt Study (1971) also found that, although larger centers cost a little less per child, they seem to find it harder to provide quality child care even when they maintain favorable staff-child ratios.

The size of the building was also a concern of a recent commission report from Australia The report of the South Australian Council of the Childhood Services Commission (1975) commented on large buildings which provide a wide variety of services.

1/ Williams (in Barker, 1968) cites a large number of studies which compared people,primarily in work settings, in small frequently undermanned settings as compared to people in large optimally manned settings. These studies all indicate more involvement in, more commitment to, and greater understanding of the setting by people in the small settings (p. 200-201).

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There is a danger, however, that such buildings could become too complex and too complicated. In England and California are examples of elaborate and expensive facilities provided for early childhood care. They are rigid in planning and construction and provide no degree of flexibility to adapt to future requirements.

p. 13

Richard Ruopp, in a recent conversation, stated that he had changed his mind somewhat about large centers -- that in recent years he had seen some good large centers and was impressed with the resources available and with the challenge which such a large staff could provide to a competent director. We, too, have seen good large centers, but still maintain that, although a large center is much more complex, it has great potential for providing an impersonal, regimented environment. A large center must be skillfully administered and it must have space which permits privacy and autonomy to children.

A large center does not work automatically. It has to be planned around the needs of small children. All too often, a large center takes the form of a gigantic box embedded in a sea of asphalt. When so many features of the environment are predetermined it becomes difficult for the staff to develop a process that encourages real creative problem solving.

Size of Group

Very few states specify in their regulations the maximum size of children's group. However, some specifications for group size do exist. South Carolina has the following regulation (Licensing Abstracts, 1971).

Age	Number of Children
0-8 months	8
mixed, 0-18 months	8
18-30 months	6
2 years	12
3 years	16
4 years	20
5-6 years	25

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Child Welfare League (1973) makes a similar recommendation, except their maximum group size for infants is more stringent.

> *The desirable number of normal, healthy children to be enrolled in groups based on age are as follows:*
>
> | *Age* | *Group Size* |
> |---|---|
> | *3-4 years* | *12-15* |
> | *4-6* | *15-20* |
> | *over age 6* | *20-25* |
>
> *In group care of infants there shall be no more than four infants ... in separate units.*

We could find very little research which looked at size of group. Dawe (1934) looked at the effect of variation in the size of kindergarten groups. His sample consisted of 433 children in nine kindergarten groups. Groups ranged in size from 15 to 46 children. She concluded that size of group did not influence amount of a story that was retained, but as size of group increased, it cut down on the number of children who participated in discussion.

Fiene (1973) examined the verbalizations of 48 children 36-40 months of age in 16 family day care, 16 group day care and in 16 home settings. He found that the number of complex verbalizations was highest in family day care and lowest in center care. He proposed that the difference is due to the smaller group size in family day care as compared to center care and to the way in which *center biases* affect play in activity areas

Often group size is determined by the size of the rooms. Cohen comments:

> *In a center, it is important to have spaces which are comfortable for different size groups. The size of a group should vary with the activities and the children's developmental level. There are times when the desriable size is one-a child privately occupied; at other times, the desirable size may be five children--watching, for example, as the caregiver demonstrates how to weave; or sometimes, 15 or 20*

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children can be quite comfortable, as when they are listening to a story or watching TV. What is important is flexibility in grouping, appropriate to different activities, needs, and times of day.

We came to a similar conclusion in our 1967 study. We found that some centers provide great variability during the day in group size. Others rigidly keep children in one group of 10 or 12 for most of the day.

The fact of variability in group size throughout the day raises questions about how group size is to be defined. If children in a group of 30 use the yard and indoor space, moving freely from one activity to another most of the day, with subgroups of 10 to 15 forming at the end of the morning, is this a group of 30, or groups of 10-15 who share use of facilities during much of the day? If grouping were to be seriously regulated, we think that such problems of definition of group size would arise.

Some maintain that cost reductions might be accomplished by alterations in group size. In our experience, there are also physical constraints which often have determined grouping arrangements.

To a considerable extent the existing spatial arrangements of the center must be considered in making decisions about grouping. The indoor and outdoor divisions of space will facilitate grouping in some centers and impede it in others. Indoor space is particularly hard to change. To keep children in separate groups indoors, acoustic as well as visual separation is important; grouping within a single space can usually be accomplished only through increased direction or restriction.

Grouping is an important issue. Variations in group size throughout the day, as indicated by a range of opportunities to play alone, to be

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with a best friend, to participate in small groups of 3 to 5 children is an important consideration in the development of quality day care. Homes easily provide opportunities for privacy or small group interaction.

Certainly young children need protection from settings which are confusing and/or frightening as large amorphous groups can be. However, rigid adherence to standards for group size might not facilitate optimal social experience.

Location of Facility

There is general agreement that day care facilities should be located in the child's own neighborhood. Child Welfare League (1973) states:

> *Day care facilities, with outdoor space for children to play actively and safely, should be located so that they are easily accessible to the families needing them, preferably in the neighborhoods where they live.*
>
> p. 76

Cohen (1974) proposes:

> *The ideal location for day care--whether a center or a family home--is in the neighborhood of the children served. Location can make or break a day care program for several reasons.*
> *.Many families cannot or will not transport their children long distances each day.*
> *.Transportation provided by the program will be expensive.*
> *.Public transportation is frequently undependable or inadequate.*
> *.Transportation is more difficult in the winter when attendance may drop off sharply if children have far to travel.*
>
> *Day care programs at the parents' place of work demonstrate the importance of good location. Since such programs are located in industrial areas, often far from the homes of working families, they almost always involve traveling long distances. Even where employers have attempted to establish free child care at the work site, parents often choose day care closer to home to avoid exposing their children to rush hour traffic and long daily rides.*
>
> p. 55

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There is also considerable evidence that parents prefer care near their own home. Rowe et al.(1972), in their study of day care in Massachusetts, found that, out of 390,000 families, 58% of parents would prefer care next door for which they had to pay $15 per week versus 33% who would prefer free care one half hour away.

Emlen, (1970) discusses Ruderman's and his own findings:

> *How great a distance from home can a working mother conveniently have a child in day care? Ruderman data show that a third of center users and 70 percent of family day care users are within five minutes of the day care. Though a center may take pride in the distance that people will travel for the benefits of its program, Ruderman reports that distance from home is associated with dissatisfaction with the arrangement.*
>
> *Perhaps institutional programs assume too much willingness to do what is inconvenient or unfamiliar. Just as one might study the habitat selection of birds, one can observe how far people tend to go in making neighborhood day care arrangements. There is value simply in recognizing that although working mothers will go considerable distance for a desirable sitter, most neighborhood sitters are indeed found close to home. In 85 percent of a sample of relatively stable, current family day care arrangements, the home of the working mother was within two miles of the home of her sitter. More interesting, however, is the cumulative percentage of arrangements found as the distance from home doubles: 44 percent within a quarter mile; 60 percent within a half mile; and 72 percent within one mile. Only when working mothers were traveling more than two miles to the sitter's home did they tend to agree with the statement, "My sitter lives too far away to be convenient."*
>
> p. 138-139

As previously noted, the initial decision about location determines once and for all certain aspects of the environment. Many programs are located on sites which are noisy and have heavy air pollution. However, these conditions often prevail in the child's own neightborhood. Probably some improvement of sites could be accomplished if the planting of trees

and shrubs were undertaken, but once located, a center must live with its surroundings. Restrictive zoning sometimes keeps centers out of pleasant residential neighborhoods and forces them into areas which have commercial zoning.

In areas where the automobile is the primary mode of transportation it is important to provide a parking area, otherwise, parents will not come into the center and will persist in dropping children at the curb.

Sometimes a large center is built without thoughtful consideration of the child population which lives within easy commuting distance. Unless the child population is high in a given area, it would perhaps be advisable to build two smaller centers drawing from a wider community.

The Physical Environment: Racial and Socio-Economic Factors

In our study of the spatial quality in a random sample of 50 centers (Prescott and Jones, 1967) we found that centers serving children from lower socio-economic levels and black children offered lower quality space. Centers serving children from families where education and income were above the median had above average amounts of space and equipment and noise levels were low. Over 70% of these centers had an overall spatial rating well above average.

Both the indoor and outdoor areas of centers serving primarily black children were of distinctly low quality by our rating scale as compared to centers serving a white or a mixed clientele. Of the nine centers with a predominantly black clientele, 88% had minimum organization, 66% had variety below the median, 77% had 3 or fewer complex and no super units, 44% had one or fewer units per child. (We consider 2.5 minimum, 4.0 or more desirable.) Inside, 67% rated at below average primarily

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because of limited equipment and noise. In this study we did not record any ratings on the availability of private places, but became aware of this dimension because of its marked absence in the centers we are describing.

Vandalism. Vandalism is often a problem in black and lower socio-economic neighborhoods and is a reason given for the lack of development of the outdoor areas.

Indoors, too, everything is often locked in cupboards. If anything is to be made available outside it must be carted out. Although the findings from this study are now nine years old, unfortunately, we think they could be replicated again.

We found that in public centers, where FIDCR standards apply, although the quality of indoor space tended to be fairly high, outside areas often had problems. Seventy percent (N=27) had total surfacing of asphalt; only 4 percent had a natural surface. Fifty-two percent of these yards had severe (lack of) shade problems.

Centers which serve a mixed clientele often are also located in poor neighborhoods, but there seems to be more optimism about developing the play area and more commitment to its importance.

Fein and Clarke-Stewart (1973) summarize findings about the characteristics of the environment in lower class homes.

> *Lower-class homes have at times been described as overstimulating, understimulating, and inappropriately stimulating by various authors--each with some truth in his analysis. Lower-class homes frequently are "understimulating" to the children growing up in them. Whether, as a result of economic pressure or personal preference, many ghetto homes are austere, without decoration (C.P. Deutsch, 1960), and lacking in cultural materials associated with development of school readiness--namely books, toys, and games and paper and other school objects (Deutsch, 1963; Gordon, 1965; Lavatelli, 1968).*

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Young (1970) describes the preschool children's environment in her southern black sample as totally human. Children are exposed to and play with no physical materials. In studies involving all social classes such material understimulation has been shown as detrimental to child development.

p. 165

Although most centers offer books and toys, we found that in centers with low spatial quality,these items were not easily accessible to children and that such centers were austere and lacking in novelty or complexity of play materials. It appears that we may have successfully duplicated in day care many of the less than optimal features of these children's home environments.

Golan et al. (1976) in a review of children's environments comment:

The third perspective we would bring focuses on the continuity of settings in people's lives. In this sense the dichotomy of indoor-outdoor, built versus natural, loses the essential totality of a child's life and may obscure real issues that are embedded across settings, and the interactive effects across settings. The child who lives in a crowded apartment is also likely to go to a crowded school, walk on congested streets, use crowded transportation. Looking at each setting, alone, vitiates the total impact of the experience and limits any conclusion about a particular place. Understanding the continuity across settings also enables conceptualization of settings in more general terms. Schools, hospitals and public housing might be treated as separate entities in a child's life, but a broader perspective would pick up the institutional components common to all of them. By including the institutional dimension, it is possible to phrase an evaluation question more broadly, i.e., to what extent does the setting under study provide opportunities for personalization and individual use. Is this another setting in which the child is reinforced for conformity or does it provide alternatives?

Provision for Handicapped Children

Cohen (1974) suggests that *a program which serves handicapped children will probably need more space for equipment, for smaller groups of children, and for more staff members, as well as such features as ramps for wheel chairs* (p. 56).

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While barrier-free design is an important consideration, in our experience adequate square footage (and, of course, sufficient staff) are the most important features to provide. For each child who is admitted, some change in the environment may be called for. However, often handicapped children can handle more of the equipment than staff anticipate. ECT 1 (1971) suggests experiences that are useful for a wide variety of handicaps and for normal children, too.1/

Balance Beam--Proprioceptive information from the body segments as they are pushed and pulled against gravity in an effort to stay on the beam. This equals kinesthetic awareness plus dynamic balance.

Step Progression--Orientation change from a horizontal to a vertical plane in space, with knowledge of up and down in space with relationship to the self a basis for depth of height.

Shelters or Caves--An internalized knowledge of how much space the self takes, a spatial relationship developed from body awareness permitting judgement of height.

Free Standing Walls--The relationship of objects in space to the self, external spatial relationship which permit the judgement of distance or time in space, temporal awareness.

Foam Pit--Motion in space, a dropping and landing, the reflexive movements of body sending kinesthetic information and tactile information via proprioception on a safe and soft landing, body awareness, internalized.

Slides--Movement on the diagonal from up to down, fast movement body balance in motion--temporal awareness in accelerated motion.

Overhead Pull Up--Movement in near space, grasp and release gravitational pull of body weight upward in space. Information from proprioceptive and reflexible mechanicism giving tactile and kinesthetic awareness also visual integration resulting in judgement of accessibility and integration of the body sides.

1/ The experiences described here are important to build into any space for children.

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Rolling Hills--Motion in space plus rotation of the self, reflexive patterns of arms and legs with tactile and kinesthetic simulation to reinforce body awareness.

Up and Down Ramps of Various Pitches--Movement of the body weight up crawling, scooting or climbing up in a prone position, a forward and upness pull against gravity, the kinesthetic and tactile feel of body pull and weight on the mode of body awareness and integration of sides.

Mirrors--Visual images of the body in motion, clues by vision for motor planning.

Conclusions

Day care is a new social form carried out by people who grew up in settings which, in many ways, were significantly different. The physical environment of day care is perhaps the most concrete and objective documentation we have of the changes which are occurring in our child rearing practices. The day care environment provided in a center often looks like and is managed like a school environment, yet day care has a significantly different purpose, as Golan et al. (1976) observe:

> *The search for alternative educational techniques and forms has made it essential to consider overall functioning rather than separate bits and pieces of a child's life. Nowhere is this as pointed as in the case of day care. The growing popularity of day care as an institutional form raises serious questions concerning the home-school continuity. The care of very young children for large portions of their days, in a culture that has moved away from the extended family while lacking a clear model for day care, is a serious issue.*

The physical environment of day care often is organized primarily to reassure adults that health and safety are assured. If decisions about the environment are based on administrators' concerns about risk and freedom from blame, many experiences which are important to children will be eliminated from the day care setting.

Regulatory requirements often are stated in terms which reinforce conformity and eliminate features that are unique, diverse and novel.

Moore (1973) summarizes his convictions about the design of children's environments:

> *It is a basic concept of ecology that diverse environments are resilient and productive. Kids too, seem to grow well in rich, choiceful, supportive surroundings. The more diversity, the more possibilities. . . The more likely that each person or group will find their own particular "turn on" and the less chance that anyone will start disrupting someone else's scene as a result of boredom.*
>
> *Diversity is a concept that can be applied to everything in the child-environment, including the qualities already discussed: place, space, time, change, movement, manipulation, openness, scale, interface, nature, sensory dimensions. All these can be subject to infinite variations.*

The design of the physical environment of day care also reveals the expectations for adults who inhabit the setting. The absence of comfortable adult furniture or objects of interest to adults often points to a total disregard for the needs of adults for stimulation and is indicative of a value structure detrimental to autonomy. We think that an important principle in child rearing, if it is to provide individualized care and attention, is that decision-making should stay close to the level of action.

Tizard et al. (1972) in a study of "institutional retardation" found that:

> *...the differences between the way in which the nurseries were organized affected all the staff in charge, whether trained or not, in the same way. Thus, in the high-autonomy groups all staff in charge tended to play and converse with the children more than did the staff in charge of low-autonomy groups. However, staff not in charge behaved very similarly in every nursery. All these data suggest that staff autonomy, whether momentary or long-term, has a decisive effect on staff behavior; if assigned a limited role, staff tend to behave in a limited way.*
>
> p. 357

It appears that when adult options are low, child options also become limited.

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Environmental design cannot be independent of the vision which caregivers have of the experiences they want for children. As Barker has observed, there is an *essential fittingness* between the environment and the behavior of its inhabitants.

> *...although it is very clear that design in and of itself does not have a universal or direct effect except in situations with limited options, children are often in just those low-choice settings. The combination of few alternatives and strict envorcement of rules about use, the reality for children in homes, hospitals and schools, leads to very patterned, stereotyped uses that have limited growth stimulating qualities. Thus, for most children, almost all supervised settings, in fact, have strong institutional components. When children do take off on a more individual use, they are generally perceived as misbehaving.*
>
> Golan et al., 1975

Regulatory requirements probably cannot guarantee the provision of individualized settings, but rigid , inflexible requirements could seriously hamper the development of such environments.

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VII

RECOMMENDATIONS FOR FIDCR REGULATIONS

Types of Regulations

Regulations can be stated in several ways. The clearest and most easily enforceable is the specific regulation, usually worded in the form *There shall be*, for example, *crash bars on all outside doors.*

The FIDCR regulations for the physical environment appear to have only one specific regulation - the control of group size.

Other regulations state the requirement but do not spell out compliance. It is possible to note the presence or absence of the specified items, but the criterion of "adequacy" is always open to argument or negotiation. We would classify the following regulations in this category:

Safety and Sanitation

1. *The facility and grounds used by the children must meet the requirements of the appropriate safety and sanitation authorities.*

2. *Where safety and sanitation codes applicable to family day care homes, group day care homes, or day care centers do not exist or are not being implemented, the operating agency or the administering agency must work with the appropriate safety and sanitation authorities to secure technical advice which will enable them to provide adequate safeguards.*

FIDCR p. 8

Suitability of Facilities

1. *Each facility must provide space and equipment for free play, rest, privacy, and a range of indoor and outdoor program activities suited to the children's ages and the size of the group. There must be provisions for meeting the particular needs of those handicapped children enrolled in the program. Minimum requirements include:*
   a. Adequate indoor and outdoor space for children, appropriate to their ages, with separate rooms or areas for cooking, toilets, and other purposes.

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b. Floors and walls which can be fully cleaned and maintained and which are nonhazardous to the children's clothes and health.
c. Ventilation and temperature adequate for each child's safety and comfort.
d. Safe and comfortable arrangements for naps for young children.
e. Space for isolation of the child who becomes ill, to provide him with quiet and rest and reduce the risk of infection or contagion to others.

FIDCR, p. 8

A third type of regulation merely cites desirable conditions, but does not indicate specific requirements. We see the statements on location of facility as falling into that category:

2. In establishing or utilizing a day care facility, all the following factors must be taken into consideration:
a. Travel time for both the children and their parents.
b. Convenience to the home or work site of parents to enable them to participate in the program.
c. Provision of equal opportunities for people of all racial, cultural, and economic groups to make use of the facility.
d. Accessibility of other resources which enhance the day care program.
e. Opportunities for involvement of the parents and the neighborhood.

FIDCR, p. 8

There appears to be no magic solution to problems of regulation. Absolute specific requirements may establish minimum standards required for compliance, yet often the minimum is, in fact, inadequate. Occasionally, it is even inappropriate. Standards which use the criterion "adequate" are often given little attention, but they offer the great advantage of flexibility. They give staff the freedom to meet the requirement in creative and individualized ways. Regulations in the form of recommendations probably are of little value from the viewpoint of enforcement, but they do suggest guidelines for good practice.

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Often regulations are judged only according to the criterion of enforceability by the regulatory agency. In actual practice, regulations have other uses. They often provide justification for the adoption of plans and the expenditure of money by groups, such as boards, which have decision-making power, but little expertise in early childhood. FIDCR regulations should be judged both for their ultimate enforceability and for their value in educating lay groups about good practice.

There are alternative, often equally effective, ways to insure quality in addition to regulatory standards. Consumers can be powerful agents of enforcement if they know what to look for and have the opportunity to choose among programs. Problems can also be eliminated before they occur by devoting careful attention to site selection, providing time for adequate planning and the necessary funding for needed remodeling and equipment.

Enforceability of Regulations

It is sometimes assumed that the provision of specific regulations will, in and of itself, insure uniform application across settings. The Illinois Fiscal and Economic Commission (1974) examined the problems involved in the widespread application of standards and noted that:

> *The word "standards" itself implies a set of criteria applied uniformly. If standards are not uniformly applied, even the most stringent and comprehensive ones may not assure adequate safeguarding of children. Nonuniform application of standards may have the effect of denying "equal protection" to day care operators if some are treated more severely than others by unique interpretations by their licensing representatives. In addition, uniformity of standards provides assurance to parents of day care children that licensed facilities throughout the state attain the same minimum levels of protection and care.*

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However, their findings about the interpretations which can be given to supposedly fixed standards are not particularly reassuring. The following responses were given by licensers in answer to questions about the acceptability of certain practices:

Question	Yes	No
Is it a violation of the standards to serve Hawaiian Punch as a fruit drink for a mid-session snack?	45%	55%
If a center furnishes transportation for children, must the driver have a chauffeur's license and not just a regular driver's license?	53	47
Is bologna an acceptable meat to serve as a main meal?	55	45
If a first aid kit contains soap, cotton balls, a roll of two-inch bandage, bandaids of varied sizes, and a package of 4 x 4 dressings but no adhesive tape, would it be an "appropriately equipped" first aid kit?	55	45
Is it a violation for a center to have a group of 10 infants with two staff?	63	37
Can the space beneath a large table (4 feet high and 30 square feet on top) be counted as indoor activity space for children?	65	35
If children in a center were not taken outside at all during the months from December to March during a normal winter, would this be a violation of standards?	74	26
If trees and shrubs occupy space in the outdoor play area, would this space be counted as part of the outdoor activity space for children in a center?	74	26
If a bathroom in a center had hot and cold running water but not toilets with running water, would this be a violation of standards?	84	16
Is it a violation for a child's hands to be slapped lightly once as a part of disciplinary action in a center?	87	13

Illinois Fiscal and Economic Commission, 1974, p. 42.

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They also conducted a paired observer study in which licensors were asked to check whether a center was or was not in compliance with certain requirements.

Item Checked on the Appraisal Form	Percent of Pairs in Disagreement
Child/staff ratios and groupings are maintained, as prescribed according to ages or handicapping conditions of children.	39%
Center provides for special groups (mentally retarded and other handicapped children).	39
Furnishings and toys for children are adequately supplied.	29
Menus are posted one week in advance.	26
Care is provided for individual children with special handicaps.	22
There are personnel policies and practices which stimulate good job performance.	22
Special requirements for food handlers are met.	22

Illinois Fiscal and Economic Commission, 1974, p. 38.

From their data, it appears as if requirements for grouping are especially susceptible to disagreement and varied interpretation.

Overall judgments about whether a facility should or should not be licensed were about as reliable (compared to some items, more so) as judgments on specific items. Interestingly, judgments on homes were more congruent than those on centers.

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Licensing Decision	Day Care Homes n = 45 pairs	Day Care Centers n = 23 pairs
Yes/Yes	74%	65%
No/No	4	9
Undecided/Undecided	4	
Yes/Undecided	11	
Yes/No	7	26

Illinois Fiscal and Economic Commission, 1974, p. 36

Recommendations

The table which follows summarizes our judgment about design features which are important and ways in which good practice might best be implemented. In making these recommendations we do not propose standards for health, building or fire safety. We assume that there are general requirements for cleanliness and that technical inspections of fire and building safety will occur.

Indoor Design

Indoor acoustics: Provide start up costs for installation of carpeting and possibly sound absorbing ceiling materials, especially where square feet per child approaches minimum.

Climate control: Give thought to setting limits on maximum and minimum temperatures permitted.

Lighting: None or local regulations; provide information on good practice and energy efficiency.

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Flooring: Encourage some use of carpet, provide technical assistance on maintenance.

Color: No recommendation. Provide information on color as a way of providing clarity and definition in space.

Doors: Provide realistic guidelines for requirement of crash bars.

Walls: Must be washable.

Furniture: Require comfortable furniture for adults, encourage use of couches, armchairs and other soft, cozy furniture.

Storage: Require adequate storage with some storage accessible to children.

Adult Places: Encourage concern for adult comfort.

Bathrooms: Provide technical assistance on good bathroom design. See if there is a data base for number of toilets required. Include a statement on toileting for infant-toddlers and school age children.

Sleeping Areas: Require provision for nap time. Encourage provision of privacy and options for children who do not sleep.

Kitchens: Encourage design where children can have safe controlled access to kitchen or some contact with food preparation.

Density/Square Feet per Child

The provision of adequate amounts of space appears to be important in controlling noise, providing necessary privacy and in preventing discomfort and irritation for both children and adults which stems from hours of confinement in small spaces. Also FIDCR programs must accommodate more adults than most day care now regulated by licensing requirements. We recommend that all programs under FIDCR regulations which provide 6 or more hours of care should have a minimum of 40-42 square feet per child.

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Outdoor Design

Location of Outdoor Play Area: Wherever possible indoor rooms should open into outdoor play areas.

Noise Level: This is a problem that requires more attention. Are there data on air and noise pollution surrounding centers in industrialized or heavily urban areas?

Climate Control: Adequate shade should be required to provide for outdoor comfort in warm weather.

Ground Cover: Technical help should be provided to encourage centers to diversify their ground cover. Exclusively asphalt yards should be discouraged. Special consideration should be given to ground cover in infant-toddler programs.

Fencing: Adequate fencing should be required with exceptions permissable. (Example of exceptions: program for school age children in a spacious rural area, family day care serving school age children.)

Outside Storage: To be recommended and considered as a legitimate expense in developing an outdoor area.

Plumbing and Electrical Outlets: Recommended and to be considered a legitimate expense.

Access Conditions: Recommend to consider in developing plans.

Play Equipment

Amount-to-do:
Variety:
Complexity: Recommend technical assistance to centers in evaluating the adequacy of play equipment for meeting children's needs.

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Safety

We feel that concerns for safety may be overemphasized and sometimes misguided. We strongly recommend that information be obtained which makes it possible to determine the types and frequency, by age, of accidents that actually do occur in centers and family day care as compared to accidents in home settings.

Privacy

Retain requirement that opportunities for privacy shall be provided.

Size of Facility

Recommend great caution in establishing facilities which care for more than 75 children. More data are needed here.

Size of Group

We see no evidence that group size is being effectively regulated -- or should be. We recommend obtaining some data here and possibly deleting the current regulations. Variability in social grouping throughout the day should be encouraged.

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